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AT

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association*

Vol. I

CHICAGO, ILLINOIS, JANUARY, 1922

No. 1

## The Baker's Coming Year

IF HE uses his opportunity as well as he can, the coming year is the baker's year. He can win through into his own.

When the war broke upon our people America was asked to duplicate the work of Israel when her sons had to make bricks without straws. Only in this case it was almost with straw instead of wheat that the bakers were asked to make loaves.

There came the day of Mr. Secretary McAdoo's compulsory meals on railroad trains when the bread ration disappeared. And Mr. Hoover's restaurant rules that eliminated

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bread, almost, from the hotel and restaurant table.

But bread is man's oldest friend. Its flavor is the one food flavor of which man, and his help-meet, woman, have never tired. Just as a famine in breadstuffs started Joseph's brethren on their famous journey into Egypt, so our wartime bread scarcity has created a new love and a new respect for bread.

Everybody feels it. There came the day of high war wages when the bloated pay envelope made workers think silk shirts preferable to bread. They turned to expensive foods. But the "silk shirt" era



has gone the way of shrapnel and the Big Bertha.

Men are back again in the bread line that leads to good health. Rising canned goods, rice and potato costs mean a reaching out again for a good slice of that old-fashioned bread.

Not only does the present readjustment bring bread into its own, but in these war years the baker has come to a point of vantage which he can now use for service as he never could before.

Women have found their work outside the home. They want kitchen drudgery again only in case they consider the baker's price unfair or lose faith in his ability to keep his bakery as clean as the ideal housewife keeps her kitchen.

This means that the most sanitary bak-

ery wins. It means that the best policy is the one that invites the housewife into the bakery as the wife would invite her husband into her kitchen.

Surrounding the baker, in this era when the world turns to him for service, and the finest loaf of bread he ever baked, are **CONDITIONS NO BAKER CAN SOLVE ALONE.**

To serve the bakers in bringing to them the latest words of science and the latest news of their interests as they broil out in the vortex of National affairs in Washington is the aim of this publication. It can only serve as bakers let it, by **MAKING ITS VOICE A COMMON VOICE FOR THE WHOLE INDUSTRY**, to be both read and written by all. In that spirit we send it forth, in search of your good-will.

## Regarding Your Employees

**M**R. BAKER, in your New Year's resolutions did you include a resolution to really hold that long deferred meeting with your employees? Did you plan in 1922 to give that little bit of extra thought you had long wished to give to the welfare of your workers, and to the building of good-will that will make your shop the home of a happy industrial family?

The Industrial Relations Committee desires to call your earnest attention to the matter of your attitude towards your employees, and towards your competitors.

During these slack times they are especially oppressing to the man with a family, and we would suggest in employing men to give consideration to this thought, and that you be more particular in the employment of men; look more into past records, and seek information from previous employers. You owe it to

the good employees about you, and to yourself to know that those seeking employment are not floaters whose main occupation in life is putting the wedge of dissatisfaction into men's minds.

If we cannot have but half a loaf in 1922, let's at least have a half loaf, and not a bone. A more related competition, a more willingness to adjust matters to a decent basis, a blue penciling of the "Dog-Eat-Dog" idea in competition for 1922 is exceedingly necessary. Otherwise you can have nothing left for yourself, nor an amount left which will permit you to extend to the worker a decent consideration. The best interest of society in general demands it in this day and time.

Wishing the bakers of the United States, their employees and their competitors a successful year against odds, we are

Very respectfully,  
Industrial Relations Committee.



# Bakery Sanitation

By DR. SAMUEL C. PRESCOTT

Head of the Department of Biology and Public Health,  
Massachusetts Institute of Technology.

THE enormous increase in the use of bakery-made bread as distinguished from that prepared in the home is one of the striking developments of the past few years. No other article of food is so universally employed as bread, and it is therefore evident that none deserves more adequate consideration as to the character of the raw materials or protection during the process of manufacture and handling. Great advances have already been made in these respects, with the re-

sult that the bread of today is undoubtedly far superior to the bakery product of a few years ago, while the protection of the loaves by wrapping and by transportation in containers which eliminate large quantities of dust and contact with unclean fingers, has gone far to assure the consumer of a clean and sanitary product. There are still, however, a great many bakeries, especially those of small size, which are supplying bread to the general public and which have not utilized these improvements. While it is undoubtedly true that a very large percentage of the bread used in American families, especially in urban communities, is now prepared in large bakeries of the better class, there is still a great quantity, when taken in the aggregate, which has its origin in small and less sanitary bakeries.

One of the problems which has been of considerable importance in the study of bread-making methods pertains to the molding of bread. This seems to occur at unexpected times, and even under conditions which are supposed to eliminate largely or entirely the possibility of contamination from dirt and dusty air, and it has not been entirely clear to those who have studied the situation as to what are the conditions which determine the molding which has been ob-

In view of the fact that the American Bakers Association is now putting into effect the sanitary code adopted at the last annual convention, the paper on Bakery Sanitation by Dr. Samuel C. Prescott, head of the Department of Biology and Public Health of the Massachusetts Institute of Technology, and a member of the National Research Council Advisory Board of the American Institute of Baking, is of special interest.

H. E. BARNARD.

served. In connection with some work carried out at the Institute of Technology with the purpose of determining if possible the reasons for molding of the bread, it seemed wise to make sanitary surveys of various types of bakeries, since in this way it was believed that much light would be thrown upon the special problem in hand, as well as upon the general sanitation of this type of food factory. These studies,\* carried out under my direction by Messrs. Strieder and Stevens, have yielded, in my opinion, very interesting results and a brief account of the findings may later be of general interest.

On looking over the bread situation in the metropolitan district, including and surrounding Boston, it was found that the bakeries could be classified according to

\* In co-operation with the American Institute of Baking.



their size and general sanitary condition. It is possible in this way to arrange the bread-producing establishments into a number of different groups. Some of these are small and relatively insignificant, catering only to the people of a particular district, or it may be of a particular nationality, while others are of larger capacity and are devoted either entirely to the manufacture of bread or make bread as one of a series of general bakery products. If one seeks information by noting the way in which foods in general are prepared and handled before reaching the consumer, he is often rewarded by interesting and frequently rather startling data. Where foods are to be subjected to further cleansing and sterilizing by cooking in the home, some of the practices followed may not be of great sanitary importance. With foods which are purchased in what is essentially the final and immediately edible form, objectionable methods of handling may, on the other hand, be looked upon with a certain degree of apprehension, although it must be frankly stated that at the present time we have practically no knowledge of infectious diseases that have certainly been spread by means of bread. Even if the question does not assume vast sanitary significance, however, there is an aspect of aesthetics and decency which is worthy of consideration, as most of us prefer to feel that the foods served on our tables have been made and handled in a cleanly and careful manner.

In order to get at the exact facts as to the general environment and sanitation of bakeries and the methods of preparation and handling of food, certain selected plants were taken, each as the representative of its class, and what may be called a sanitary survey or inspection was made in each case. The bakeries studied were

nine in number and may be characterized as follows:

A "system" bakery.

A small Italian bakery.

A "model" Italian bakery.

A suburban American bakery.

Another "system" bakery having plants in different cities.

A bakery of the largest type, employing methods of scientific control directed from a central station.

A smaller scientific bakery.

A small store bakery, that is, run in connection with a retail establishment.

An inferior French bakery.

These were all located in Boston or the immediate surroundings and the population served included all types of people. Before making the survey, each bakery was visited one or more times, an acquaintance established with the superintendent, manager or owner, the general purpose of the intended survey was explained and permission obtained to carry out the inspections which followed.

Previous to the survey itself, a score card was prepared on which were listed the characteristics or qualities of environmental conditions, methods of handling and types of equipment which might be regarded as desirable and satisfactory from the sanitary point of view. This score card follows the general form of score cards which are commonly used in inspection of dairies, stores and industrial plants, and while no score card can represent perfectly the exact opinion of the inspector or the exact condition which prevails in a plant as compared with another, they serve better than any other way which seems to be available to make it possible to compare establishments directly. By giving certain weights to the individual items on the score card a perfect score of 100% is obtained for the establishment with which no serious fault



can be found. Departures from what might be regarded as entirely satisfactory conditions of excellence were obviously penalized by reducing the weight for the individual item. While, as in all other forms of score cards, where attempts are made mechanically to express sanitary excellence on a percentage basis, some minor difficulties were experienced, but on

general relation to streets, alleys and backyards. The second group of subjects concerns those details of construction and operation which may be said to bear directly upon the sanitary condition of the worker. Here would be considered toilet facilities, facilities and regulations for washing the hands of the operatives, sanitary plumbing, requirements of special

### BAKERY SCORE CARD

Name of Bakery.....Date.....

Address .....

	Perfect	Allow
1. Above ground.....	10	....
2. Well lighted.....	10	....
3. Well ventilated (artificial).....	5	....
4. Unconnected by door or hall with living room or with rooms used for other business.....	5	....
5. Screen, 2; free from flies, 3.....	5	....
6. Floor, walls and ceilings clean (deduct 5 for expectoration on floor) .....	10	....
7. Water-tight floor .....	5	....
8. Water closet does not open into room in which food products are handled .....	5	....
9. Basin for washing hands, sanitary plumbing.....	5	....
10. Employees wear clean uniforms, 2; free from disease and clean in person, 3.....	5	....
11. Utensils, mixers, dough troughs and racks clean.....	10	....
12. Protection of raw materials.....	5	....
13. Handling of production, process of manufacture.....	5	....
14. Mechanical mixer .....	5	....
15. Handling final product.....	5	....
16. Bread wrapped in bakery.....	5	....
	100%	....

the whole the results have been of much value in picturing the general conditions at each plant. If such a score card is used with common sense and an unbiased attitude, it seems possible to arrive at conclusions which are very useful in character. As will be seen from the accompanying form of card, the data determined are collected under several different headings. First, we have that of the general environment, including the location, position in the building if not occupying the whole building, immediate surroundings, type of construction and

uniforms during work, personal cleanliness and freedom from disease. The third group of facts sought pertained to the character and cleanliness of utensils, such as mixers, troughs and racks and the protection of raw materials by proper storage. Finally, the data pertaining to the handling of the product during manufacture and in the finished state were collected. Appended herewith is a score card to each item of which the weight given for a perfect score is assigned. The examination of the bakeries mentioned in

(Continued on page 7)



# The Baker and the Bloc

*How the Public Is to Be Tariff Taxed on Cakes to Give Sectional Monopoly Market*

**B**ECAUSE California walnut growers, orange growers, almond growers, and poultrymen have learned to operate farms as individuals and sell their product as one man, working through consolidated organizations, they have been able to build up large bank accounts in concentrated form.

These bank accounts are under the control of certain managers of co-operative enterprises and are being constantly added to through per-box and per-package propaganda fees assessed against every article sold.

Thus eastern consumers in the great American cities produce the propaganda funds of the California organizations as well as the profit and production funds.

From industry it has been easy for the California folks to pass over into politics.

The strategic position gained by Senator Hiram Johnson, as an insurgent whom eastern senators wished to hold in line for "Normalcy," made it possible for him to ask whatever he wished in return. He celebrated his peculiar power by asking for tariffs.

He asked for unheard of tariffs on bakers' products that California never has and never can produce in volume to meet

the American demand. Up sprang a group of congressmen who were ready and willing to meet the Californian expectations. They had tariff plans of their own and could inter-trade within the bloc for the biggest results.

One result is a little different than perhaps the trading bloc members anticipated. The name "Agricultural bloc" is on everybody's tongue and folks are discussing it in the terms of "the New Sectionalism," "the California raid on eastern consuming centers," and "the land-shark almond selling plan put over to capitalize a tariff raid."

Now it happens that the bakers are hardest hit of all in the tariff plans for

nuts and eggs. That is, the bakers are the most immediately hit, but they will have to pass the new tariffs, if enacted, along to consumers. This fact makes the bakers and the public in the great eastern cities natural friends and allies.

The Indianapolis News, one of the great newspapers of the country, has seen this coming alliance and has hailed it in a remarkable editorial against tyrannical blocs. It asks why a prohibitive tariff on filberts, for instance, of which California does not raise a single one?

## *An Important Telegram*

*Outlining the New American Sectionalism*

Chicago, Ill., Jan. 6, 1922.

Senator Arthur Capper,  
Washington, D. C.

Indianapolis Convention American Bakers declared by unanimous vote that Agricultural bloc's program for high tariff raises on almonds, walnuts and eggs, constitutes a shameless raid on the dinner pail of 20,000,000 users of bakers' products in eastern consuming centers. This to give California our eastern cities as a monopoly market.

We urge you to work against bloc's nut and egg tariffs schedules to prevent bringing on buyers' strikes against long established low-cost foods based on imported shelled nuts and eggs.

H. E. BARNARD,  
Mgr. American Bakers Association.



The bloc members no doubt feel that if filberts are forbidden, Americans will turn to almonds. And California has never raised almonds for the baking trade. The shelled almonds, used in almond pastes, almond cakes, and in frostings, are sweet almonds imported from Spain. They are different in flavor, texture, and size from any raised here.

The bloc asked for 15-cents-a-pound tariff on almonds, with California able to grow only 9 per cent of the amount used annually in America. Full page advertisements in Chicago newspapers for almond lands in California, attest the purpose to which the tariff is to be put. If eastern buyers buy these lands and plant almond trees in nine or ten years the American bakers can start making almond cakes again at a reasonable price.

It is the same with eggs and grapefruit. Pioneers from America went to the Isle of Pines when it came under our flag and started an American industry there. It matures grapefruit in August and September, while California and Florida ripen none until two months later. Yet the bloc would shut out Isle of Pines grapefruit to limit America to home-grown goods.

The baker has a problem here. It is to let his customers in eastern cities know what the bloc program is, and what the eastern cities will have to pay if made helpless vassals of a sectional control. The press and the public are responding in splendid style to all efforts at enlightenment.

There are more people in the eastern cities than on the California farms that feed the Agricultural bloc its gospel on egg, almond and walnut tariffs. If the eastern cities are thoroughly aroused, it is obvious that congressional delegations will hear from home things against

tyrannical sectionalism they have never heard before.

Indiana bakers started the ball rolling with strong resolutions and much first-page news service against the oppressive tariff plans made to please Senator Johnson and his friends. Bakers will watch closely this new eastern resentment against monopolizing plans for bakers' products. Many leading bakers consider that political friends and alliances may be made over this issue which will ripen later on into conditions that can vastly help the industry. The baker as well as the almond grower and walnut grower can go into politics.

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### *Bakery Sanitation*

(Continued from page 5)

the original list have yielded some highly interesting results. Without describing each one of these in detail, it may be stated that the large bakeries employing scientific control have, in general, given a very high score, in one instance actually reaching 100%, while in another the score obtained was 94. Contrasting with this, on the other hand, were some of the small bakeries in which the attempt to use sanitary methods had apparently been entirely overlooked, and as may be supposed, the score in such cases fell far below what might be regarded as a proper passing mark. The lowest score obtained in our study was in an Italian cellar bakery where, even with generous scoring, a percentage of 43 was the best that could be awarded. On the other hand, a "model" Italian bakery gave a figure of 85.

Should it be found desirable, a more extended account of this work will be presented to the readers of "Baking Technology" in a future issue.



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entry in the post-office at Chicago, Illinois, as second-class matter, applied for under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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JANUARY, 1922

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### *Our Readers & Ourselves*

**B**AKING TECHNOLOGY enters the field of baking literature for the definite purpose of developing the scientific interests of the industry. It is a fulfillment of the plan to publish the results of investigations by the research laboratories of the American Institute of Baking in such form that they will be available to all bakers and all interests which have a common purpose in the production of better bread. The bulletin which has heretofore carried the reports from the laboratories has had a restricted circulation. BAKING TECHNOLOGY will reach out to a larger group in which chemists, technologists and experts in the milling and baking field gather for the study of mutual problems.

BAKING TECHNOLOGY will be the medium through which scientific reports, projects which are devel-

oping, impending legislation and all other activities which are of vital interest to the baker are carried to the membership.

The reorganization plans of the American Bakers Association gather under one roof, in the new home of the Association, the Institute, which is the scientific branch of the industry; the School of Baking, with its splendid facilities for training the bakers of the future; the library, with its wealth of knowledge of cereals, fermentation processes and old and up-to-date baking practice; the executive offices and the varied activities of the Association. BAKING TECHNOLOGY will tell the story of these departments and it will bring to the membership the plans and accomplishments of the committees on Trade and Industrial Relations, Publicity and Advertising, Sanitation and Ethics.

Bulletins, weekly letters, the splendid service of the trade papers, all carry the news of bakers' activities. But in the mass of such information specific problems are often buried and lost and the baker member fails to catch the dominant note of the moment. It will be the purpose of BAKING TECHNOLOGY to sound this note. When tariff legislation is pending it will ring out clearly and direct necessary action; when epidemics of bread bargain sales sweep the country and editors and readers



alike conclude that five-cent bread is really a fact instead of a fire sale the flaws in the reasoning will be shown; when assaults are launched against bread the weapons for defense will be gathered from the literature of chemistry, nutrition and economics, and put into the hands of every baker.

BAKING TECHNOLOGY will not report convention news. It will not cover the important field of the news gatherer for the baking industry. It will carry no personals. It will represent no section of the country and no special group or field of work.

As the official journal of the American Bakers Association BAKING TECHNOLOGY will keep member bakers informed of the progress of association activities. It will tell the story of scientific achievements in the laboratories of the Institute. It will summarize the results of work in the technical and service laboratories that the data there obtained may be available for all. It will serve as the link between the school and the industry, outlining the courses, developing the contacts between bakers and students, reporting results as they promise to be of value. It will officially proclaim the standard set by the Institute for flour, sugars, shortenings and all other materials used in the bakery. It will carry the official methods worked out for the testing of these

materials. It will be, in fact, the authoritative word of the American Bakers Association.

H. E. BARNARD.

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### “Meet My Standard”

**C**AVEAT EMPTOR, let the buyer beware, is a seller's slogan which has cost the world uncounted millions since that early day in the history of commerce when his ignorance made it possible for the first merchant to work off his stale fish or damaged hides on our cave-dwelling ancestor. *Caveat emptor* has been the plea behind which every opponent of food laws and food standards has lined up his attack on honest business regulation. *Caveat emptor* is still the argument of the merchant who would have his customer buy by brand instead of by test.

But the baking industry has a new slogan. “Meet my standard” says the flour buyer who knows what he wants and is willing to pay for it. “Meet my standard” is written across the order blank of the baker who is replenishing his stocks of milk and sugars and shortenings. “Meet my standard” says the baker who needs a new oven, another divider, more delivery trucks.

But standards are possible only when measuring sticks are handy. The baker who has no way of testing his flour takes what he gets.



The chemically controlled plant gets what it buys.

The American Institute of Baking, now installed in its new and ideal home, offers every baker the service he needs in buying his supplies. It sets the standards for the gluten and moisture and ash content of his flour, and then tells the baker whether or not his orders were honestly filled. It determines the kind of material which will best meet the need and holds the seller to the letter of his contract.

This is service, the kind of service which is making the baking industry an applied science instead of a rule-of-thumb trade.

This is the way by which the American Institute of Baking will justify the faith of the men who made it possible.

### *Honolulu Speaks Up*

Honolulu, Hawaii, Jan. 6.

We have been following closely the changes taking place in the American Bakers Association, and it is indeed gratifying to see that the American baking industry has men at the helm who have foresight and pride in their industry. This can only result in better feeling and co-operation both inside the industry and in contacts between the industry and the general public.

Love's Biscuit & Bread Company,  
Per G. S. McKinzie, Manager.

### *And Who Will Win?*

Great Falls, Mont., January 21.—(Associated Press Dispatch.)—Bread is being sold at prices ranging from 2 cents a loaf to nine loaves for 25 cents as the result of a bakers' war. One store is giving away a loaf with every 25 cent purchase.

The public has been made fully aware of the evils of profiteering. More slowly it learns that industries may be undermined as happens here, and the public left poorer in the end.

### *If Bread, Why Not Rents?*

THERE is no doubt that the political leaders and the great masses of the people have their hearts set upon the 5-cent loaf of bread as an immediate contribution "towards Normalcy."

The chronicler of these words has just read some hundred odd news articles and fifty odd articles dealing with the 5-cent loaf. And with them were a hundred or more dutifully drawn cartoons representing Father Knickerbocker, Father Dearborn, Father Penn, or some equally startled old gentleman in the act of welcoming back the long-lost child of our great cities.

But every news article dealt with a chain store, a department store, or a general store using bread instead of trading stamps as a business getter. Yet every editor, except one, hailed the return of the 5-cent loaf as certain and assured, "because bakers putting it out would not do so unless it paid them."

This one exception was the editor of the New York World. He asked, "If Bread, Why Not Rents?" We can echo his sentiments there. The editors make ill-will for the bakers to no good purpose if they pound at bread prices, and say nothing of rents, coal, gas, transportation, overhead and repairs.

Attorney General Dougherty even joins in the cry for the 5-cent loaf, but might he not to advantage turn his attention to the BASIC costs that the baker, along with all the rest of humanity, has to pay?

If the Attorney General, for instance, will deal with coal, light, transportation, including Pullman doubled fares, building and repair costs, and then come back to the bakers, we can assure him he will find them far down in the Valley of Normalcy doing their bit with the rest of humanity to carry on.



# Baking Bread for a City

*Dr. J. H. Kellogg, Famous Food Expert, Tells of  
Marvelous Growth of Our Industry*

FOR more than fifty years Dr. J. H. Kellogg, the world famous dietician, has practiced and taught the science of simple foods.

It is but natural that after a full half century of intimate contact with dietetic ills he should turn, as he does, in a recent issue of his journal, *Good Health*, to the discussion of bread and emphasize the fact that the development of commercial bread baking has meant "not only an increase in the quality of bread but a saving in time and labor which is a colossal asset to the big majority of American homes."

The story of the progress of the industry is well told by the author and should be read in its entirety. Some of the striking points he makes are repeated here:

"Perhaps the oldest industry of which we know anything—and certainly one which fills a vital need of the human race—is the baking industry; and yet it has been the last to adopt the improvements of modern progressiveness. However, once this industry did start out of obscurity, the progression has been by leaps and bounds, and today it holds ninth place among the leading industries of the United States, by far the greater part of the development being made in the last quarter of a century.

"For a long time the American home did not take kindly to the output of the commercial bakers; the discriminating taste of the people was not satisfied either with the final product, its method of preparation, or the cost. But today the conditions are changed, for (taking the United States as a whole) an average of

fifty-five per cent of the bread consumed is made in the commercial bakery; while in San Francisco this percentage runs up to eighty, for this city stands unrivalled in the United States both for the quantity and quality of its output in this industry.

"In 1919—the last year for which we have dependable statistics—bread and bakery products in the United States reached the sum of \$1,406,145,000. This was an increase of 186 per cent over the preceding five-year period. And yet, less than twenty-five years ago the great majority of bakeries were housed in the basements where the ventilation was exceedingly poor and the physical conditions far from sanitary; all of the work had to be performed by hand; the average working day for the baker varied from twelve to sixteen hours; and after he had mixed the heavy dough in the heated atmosphere produced by the old-fashioned ovens the interior of the bake-shop was not inviting to the discriminating taste. The only tolerable thing about the old commercial bakery was the actual baking of the bread. Mixed by hand, molded by hand, proofed in poor ventilation under unsanitary conditions, when baked allowed to cool under the same unsatisfactory conditions, sold unwrapped, handled and rehandled by many hands, small wonder that the American housewife would have little of it. Only absolute necessity would force her to buy it; as a matter of fact only 25 per cent of the bread consumed was at that time purchased from the commercial shop. But necessity and public demand

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# Chicago's "5-cent Loaf" Frauds

*Fair Price Commissioner Russell J. Poole Investigated and Found  
An Advertising Dodge Instead of Valid Merchandising*

**A**MONG those who are earnestly working for the return of the 5-cent loaf of bread is Russell J. Poole, a conscientious public official who recently figured in the papers as breaker of the egg market and certain phases of the meat market.

Mr. Poole serves the public as the Mayor's food expert and secretary of the Fair Price Committee of Chicago. When the editors of Chicago papers began to "sensationalize" the fact that certain department stores sold bread at 5 cents a loaf, and demanded in editorials, cartoons and news columns that all bakers follow suit, Mr. Poole called the Chicago bakers before him.

Luckily for what follows in this story Mr. Poole would not let his wish for 5-cent bread father a drive against all facts and all good conscience.

"If department stores can sell 5-cent bread why can't you all?" asked Mr. Poole. He named one store doing it.

"I bake the bread for that store," spoke up one baker present, "and here are my receipted bills for it. They are taking a loss of 2 cents a pound on every loaf they sell. It's just an advertising dodge. And I can't bake any more for them at the low price I made them, as I found I was baking at a loss."

That was revealing. Thousands of editors in thousands of cities were singing one editorial refrain: "If they can do it in New York and Chicago, why can't they do it in our town? They must make it there at a profit. Five-cent bread must pay. Our bakers profiteer."

Mr. Poole moved over to the case of another 5-cent bread vendor.

"Oh, that's a trick," explained one baker. "You can put in 17 ounces of dough and leave it half baked and soggy and it will bake out at 16 ounces. It takes 18 to 19 ounces to make a real 16-ounce loaf."

The baker took some dough from the center of a loaf he had bought at a sale. It struck the floor like a ball of putty.

The facts as to all the other 5-cent vendors were examined to clarify the situation as to what they were actually doing. One baker reported he had stood in line an hour and a half for a 5-cent loaf to see how it could be baked, and even then had not got to the bread counter. The path lay through lines of other highly profitable food offerings.

To make the matter fairly clear some vendors dropped the price to 2 cents a loaf and 4 cents a loaf. These figures even passed popular imagination as to what could be done, and it became manifest that a come-on advertising dodge was at work.

The bakers suggested a real campaign in dishonest advertising was what the situation called for. The newspapers, with their full-page advertisements from the department stores did not clarify to the public either the facts shown at the Poole hearings or the facts as to the actual extent of the 5-cent loaf salesmanship.

Mr. Poole is a searching man, however, with vast selling experience. He examined bakers' books. Then he gave out this significant summary of his investigation:

"THE BAKERS HAVE PRESENTED THEIR BOOKS WHICH SHOW IT IS



IMPOSSIBLE TO PUT OUT A 16-OZ. LOAF OF BREAD OF THE STANDARD QUALITY BEING PRODUCED, PROPERLY BAKED AND WRAPPED, AT 5 CENTS. The bakers expressed a wish to co-operate with our committee and reduced the price 1 cent a loaf, which reduction went into effect at once.

"The bakers produced bills showing that one of the biggest bakers here had baked 6,000 loaves that day for a department store which was selling bread at 2½ cents a loaf. This baker had the check of the department store for 7 cents per loaf. The store was taking a loss of nearly 5 cents a loaf, while the baker declared the bread was from a batch of poorer quality than his standard.

"I am for the 5-cent loaf of bread as soon as it can be legitimately obtained, but I realize that flour and materials amount to 41 per cent of the costs only and that other important elements, such as rents, labor, overhead and delivery costs are still above pre-war levels."

That's the Chicago case. It is in no way different from the New York case. The baking industry, without a spokesman, has been bullied and harried by local newspapers which did not let the facts interfere with a good story. Do your local newspapers know the facts herein set forth? If not, when you face comment based on misinformation such as Mr. Poole faced, ask your editorial friends to face the facts as he did.

### *Baking Bread for a City*

(Continued from page 11)

for a better product are ever-efficient goads. And finally out of it all was evolved the present day bread factory, which in point of machinery and specialized equipment ranks equal to any of the other industries.

"Truly is the process of baking bread for a city an interesting one, and so well has the proprietor of the commercial bakery mastered the problem of machine-made bread that he has convinced the housewife that he can actually bake bread for her more economically than she can bake it for herself, better than she can bake it, and just as cleanly as she would wish it done, saving her all of the tedious labor which it requires of her.

"It is interesting to look at this industry in comparison with some of the other modern industries which provide for man's comfort and well-being. Taking a five-year period from 1914 to 1919, the meat-packing industry made an increase of 155 per cent in the value of its output; flour and grist mill products for the same period increased 150 per cent; cotton goods, 178 per cent; while bread and other bakery products made a gain of 186 per cent. Iron and steel products increased 206 per cent; steel shipbuilding, 209 per cent; automobiles, 275 per cent; and petroleum refining, 315 per cent. But bakery products have risen from \$491,893,000 in 1914 to \$1,406,145,000 in 1919! A gain of near a BILLION DOLLARS in five years, and when the statistics for the three years from 1919 to 1921 are available, they will without doubt reveal more startling facts still.

"But better than all of the financial gain is the increased value to the human race; an increase not only in the quality of the food product but a saving in time and labor which is a colossal asset to the big majority of American homes. The food value has been kept intact, the cost reduced and home labor decreased.

"The product of the commercial bread factory is not only here to stay, but it has won its place among the rightly known necessities, and the next years hold promise of better things to come."



# The Ideal Loaf

*and How to Score It\**

**W**HAT is a standard loaf of bread? If the best loaves made today by twenty successful bakers were brought together what essential characteristics would they have in com-

a loaf of bread is a loaf of bread. It cannot be measured because there are no standard measuring sticks.

Any attempt to standardize bread by specific requirements as to composition,

## *The Ideal Loaf*

*As Scored by the American Institute of Baking*

EXTERNAL APPEARANCE		INTERNAL APPEARANCE	
Volume .....	10	Grain .....	10
Color of crust.....	8	Color of crumb.....	10
Symmetry of form.....	3	Flavor (aroma) .....	15
Evenness of bake.....	3	Taste .....	20
Character of crust.....	3	Texture .....	15
Break and shred.....	3		70
	<hr/> 30		

mon? Would they be similar in shape, size and weight? Would they be the same in color and flavor? Would they have uniform texture, crust and crumb?

Indeed it is quite probable that no two loaves would be alike. Such a difference in standards does not exist in most other food industries. Butter is scored so closely that every butter maker knows exactly how his product is valued. Milk has definite standards of composition and bacterial condition; so has cheese and other dairy products. Canned fruit and vegetables conform to well defined limits of composition. Even such doubtful things as storage eggs are graded and classified, according to the standards which are recognized by the trade. But

size, shape, nutritive value or flavor will meet with failure. Bread is not adapted to standardization as is the case with steel, printers' type or many food products.

Bread is an ideal product representing the judgment of the baker as to the type and character of loaf most desired by his customers. There can be no uniformity of formulas. To adopt any set formula for bread would only destroy competitive ambitions and would set low levels as normal or basic requirements.

The only standards which are advisable are those which may check or control practices which may become injurious or which are essential to proper nutrition. So, for instance, a maximum moisture content may be advisable. Indeed as the science of nutrition is better understood,

\* Compilation of data collected by the American Institute of Baking.

# A Message to the Home Folks

*You Need to Educate Them and the Press as to  
Many Factors of Baking Costs*

NO STORY is more interesting than the story of bread. But the story is often poorly told and the baker is pilloried as a profiteer or called upon to sell bread below the cost of baking it.

The way to set the mind of the public right is to take the facts into the home to show "John and Mary" why bread costs are still up and how you can not reduce them until more material costs are down to bed rock than sugar and flour.

"Baking Technology" will print each month, as an insert which can be torn out without injuring the copy or disturbing the paging, a series of short editorials and bread stories which will tell the real facts about the baker and his products.

Tear out these two inside pages, cut out the separate articles, copy them on the office typewriter or take them in their printed form, go down to your friend in the newspaper office and say, "Here, Jim, you have been printing a lot of good stuff about bread lately. The only trouble with it is that some of it isn't so. I don't blame you very much. You thought you had the facts all right, but there is a lot more in this bread business that you think. Now you run this stuff and set your readers who are my customers right on this five-cent loaf business."

**WE WANT TO MAKE THIS INSERT  
A REAL FEATURE.**

We shall never know whether or not it has any value unless you bakers use it and then tell us how you used it.

So whenever you get one of the stories into your paper, or into a talk before the Rotary Club or the Chamber of Commerce or the League of Women Voters

write us how it went. And send us clippings of the stories. They will help fill our scrapbook and encourage our writers.

And whenever a "knock" on bread is printed or spoken send us the story.

Often a knock develops a good comeback.

It is always well to remember that no bully ever delivers a blow without lowering his guard.

We welcome fights. We have the facts with which to win.

And we are counting on you to come to us for our help every time you run against trouble.

That is just exactly what the American Bakers Association is for. It is your central clearing house, and useful only as you use it.

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## *Have You a Boy for Baking School?*

J. P. Duffy of Rochester, N. Y., obtained remarkable answers to an inquiry among high school and grammar school students as to what professions or trades they aspired to.

Not one aspired to be a baker. Yet the scientifically balanced loaf of the future must be baked by college bred men, to whom the "A. B." degree means "A Baker."

The American Institute of Baking is making its school laboratories ready. If you have a son, and love the baking business as a source of joy as well as a living, get him ready for the pioneer term. It will open in the spring, following definite announcements soon to be issued.



# A News Service for Your Paper

## CHICAGO FIGHTS HIGH TARIFFS ON BAKERS' GOODS

**Will Oppose Agricultural Bloc; Plans  
for Huge Raises in Tariff on  
Nuts, Eggs and Flour**

Chicago, January.—Two weeks ago Russell J. Poole, city food expert of Chicago, was sure the bakers of Chicago could help get the city "back to normalcy" by dropping bread prices.

The bakers waited until they could do so without being forced over into the red side of the ledger. Then they came down 1 cent per pound. Now they have enlisted the friendly services of Mr. Poole in making clear to eastern consuming centers, the kind of a drive California is making against their pocket books and their dinner pails.

Dr. Harry E. Barnard, manager of the American Bakers Association, outlined to the Chicago authorities the extremes to which California almond growers, walnut growers, and egg producers are going in their efforts to gain tariffs through the agricultural bloc that will make eastern cities dependent alone on California's monopoly markets.

In making the case for walnuts Dr. Barnard showed that the California product had always been sold for table use and had never become a baker's material for use in cake frostings and confections, or even in nut sundaes. All these walnuts he showed had been imported from the time the baking industry first started.

They were imported shelled, and many varieties had found each its special trade and its special use. The cost was vastly lower than the California table walnuts, and this low cost was passed on to the people in the form of low-cost cakes.

It was the same with almonds, except that California almonds were found to be so fibrous that cake makers could not use them at all and so lacking in flavor they would prove no temptation in almond bars and as a nut covering for ice cream. Jordan almonds, the sweetest in the world, had long been imported for these trades. Dr. Barnard showed how in California they were capitalizing the proposed tariff by selling almond lands from which we could hope for almonds nine or ten years from now. Now not over 9 per cent enough are produced for the American trade.

## SOUTH STARTS A REFORM IN BREAD MAKING

**Blame Yeastless Biscuits for Dis-  
eases of Malnutrition, and  
Abandon Them**

Chicago, Ill., January.—What officials of the America Baking Institute believe is one of the most important dietary reforms in America is now in progress in the southern states.

Through the study of vitamins food chemists have discovered many things that have bothered the doctors for many years. They have found that a whole group of so-called diseases that were once ascribed to bad air or lack of exercise, really are due to malnutrition or improper food.

Characteristic diseases of the South are prominent in this list. The chemists have found they could feed a test animal vitaminless food for a few weeks and give it scurvy, pellagra, beri-beri, softening of the gums, loose teeth, and even crumbly bones.

The cure in each case was to substitute vitamin-bearing foods, and not to try washes, medical dosages, or surgery. In the case of the southern states it was found that baking-powder biscuits were a popular food in place of yeast-made bread.

In these districts the motherly instinct that made many generations of housewives cling to yeast-made breads, seems to have deserted the population.

Now dieticians are busy making it clear that mother's loaf, made with yeast, is the ideal loaf, and that good baker's bread comes just as near to mother's best product as it is possible for baking chemists to come.

A general crusade against all ailments entering the baking industry that tend to make the finished product short of vitamins, is now being waged in the southern districts where it is needed most. Chemical tests are being made to determine the finest kind of baked products, and see that the southern population gets them along with the rest of our people.

## WANTS TO SEE BIG INCREASE IN BREAD'S USE

Buffalo, N. Y., January.—The Buffalo Courier, in a clear-cut indorsement of bread as a food calls for its broader use in these terms:

"A scientist of nationwide reputation states that in national diet, cereals could well supply 50 per cent and dairy products 20 per cent of the individual diet. Real value is based on what any commodity gives, not on what it costs in dollars and cents. Bread has been called 'the token of civilization.' And the rapid strides in progress which the western world has made over the orient is by many students attributed to the fact that bread is a more complete food than rice.

"Half the world is dependent upon the United States for wheat to supply this highly nutritious food. Such vast agricultural resources make this country a great humanitarian power in supplying the sustenance that makes human beings in all parts of the world more efficient. One noted authority says that if the consumption of bread in the United States were increased even up to 65 per cent of the diet, people would generally be better off as to health, and the cost of living would be perceptibly lessened."

## OLD TIMER TOLD OF BREAD COSTS

Chicago, January.—An odd character signing himself "Old Timer" is a regular contributor to the Indianapolis News. He recently delved into the war-time history of bread. He found that when war was declared in 1914 wheat was 80 cents a bushel, and that wheat by April, 1917, was up to \$2.57 per bushel, and flour 8 cents a pound to housewives.

On April 15 of that year he found the bakers met to conserve flour and accepted an order against allowing the return of stale loaves. Now Old Timer finds that flour and wheat have subsided in price, and he asked the newspaper in a letter, "What is the mysterious thing that keeps the price of bread up?"

The editor of the News did not inform "Old Timer" but the American Institute of Baking did, with its tabulated cost sheets for the baking industry. Its figures suggest that "Old Timer" ought to pay for a week a chauffeur deliveryman at \$45 against a pre-war price of less than half of that; that "Old Timer" ought to rent a flat to live in for \$140 a month when it rented before the war for

(Continued on next page, col. 3)

# See That It Is Delivered

[Lift from the Staples—Tear  
along double line, and send  
to your Local Editor]

## BAKERS' SIDE OF PRICE STORY

Bread Authority Tells How Mothers  
Were Lured Out of Kitchen

Chicago, January.—Editors of all metropolitan newspapers were pounding the bakers for lower prices, because chain stores using bread in place of trading stamps had offered 5-cent and even 3-cent loaves. Dr. Harry E. Barnard, manager of the American Bakers Association got into action and painted a picture of baking conditions that was quite new to the pre-occupied editors. Here is what the Chicago Post printed from him:

"To the Editor of The Post. Sir: The baking industry, which is a great manufacturing industry now in the process of rising rapidly thru the ranks of American industries, has had from the very day of its inception to fight its way against the worst-paid and most-loved labor in our land.

"Won't you please take note of this fact when news items come along which seem to indicate on their face that bakers are profiteering? No baker can live if Mrs. Housewife in her kitchen goes back to shake a vigorous elbow at her old-fashioned dough pan. The baker lured the housewife out of the kitchen. He did not drive or coerce her out. He thrives by her good will.

"As the most underpaid and most appreciated laborer in the world, mother gained her freedom from kitchen drudgery thru the development of great baking machines. The fight now is to reduce mother's intuition to an exact science and reproduce her ideal loaf with every one of the hundreds of thousands that pass thru one of the great ovens weekly.

"Consider the case of a baker who has built a seven-story plant just to get all baking operations out into the sunlight; who has built vermin-proof, rat-proof and fireproof storage rooms so that his flour will be kept clean and wholesome; who has raised wages to a decent living level, and has installed a recreation floor as a builder of good will.

"Then consider how he feels when his public is suddenly set upon him by reports that other bakers have made a 5-cent loaf so that he must of necessity be a profiteer. If this were really true, we would have no complaint, but every baker knows it is not and cannot be true. A baker whose flour, shortening, labor, delivery and office administration expenses exceed 7 cents per loaf, under the most efficient and scientific management, looks beyond the face of these 5-cent-loaf reports.

"He finds in New York a chain store is selling a 5-cent-loaf. It has overheads that can be switched and indirect profits to harvest that make losses a matter of indifference. He finds in Chicago department stores are doing it, where advertising accounts can absorb costs and overheads are carried by other accounts.

"The baker knows these things. Will you not let him influence his

## WHOLE COUNTRY WATCHES WEEK OF BREAD, MILK

Pennsylvania Feasts on Old Fashioned Farm Diet

Harrisburg, Pa., January.—In all parts of America folks have shown a responsive and reminiscent interest in the return of Pennsylvania to her old fashioned "bread and milk diet."

They have had a "bread and milk week" which means that health authorities, food experts, dairymen and bakers all combined to demonstrate that milk and bread is the true basic diet for a healthful community.

During "Bread and Milk Week" the idea of using meat as the basic diet, which was greatly increased during the war, was attacked by vitamin experts, by dentists who claimed that teeth decay for lack of the mineral salts in bread and milk, and by dairymen and bakers who claimed that they milked cows and baked in vain if the people did not have the highest regard for their twin-products in point of nourishment and the balance needed to sustain life.

Bread and Milk Week opened with a public statement indorsing it sent by Herbert Hoover. Next came bread and milk luncheons in the public schools. Half page advertisements proclaimed the faith of the bakers and milkmen in their products.

Rotary and Kiwanis clubs gave bread and milk luncheons. Cooking teachers gave out bread and milk recipes, while the retail bakers, as a final touch to the week painted up their places and brought the insides to show room perfection. Thus women who had always feared bakers' bread were shown how sanitary the bake shops were, and how much cleaner, even, than their own kitchens were the big bakeries where bread in volume production rolled through the mixing troughs, into the ovens and out into the wrapping machines.

The success of "Bread and Milk Week" here means that it will be followed by similar demonstrations all over the country.

public, whose fellowship he needs, to understand them, too? Get our fuel costs down, our lighting costs down, our transit down, our rents down and the baker will be very glad to follow on down with the price of bread as fast as he can do it and keep on the black side of his ledger.

"H. E. BARNARD,  
"Manager American Bakers Association."

## TARIFF JOKE ON AMERICANS

It Stops Canadian Flour, but Lets  
Baked Bread Through

New York, January.—One of the prettiest little post-war jokes yet played upon Uncle Sam by the folly of his own law makers is the flour-and-bread joke along the Canadian border.

The agricultural bloc wants a heavier-than-ever tariff on flour, but it has never stopped to think of baked bread. That comes in duty free.

As it happens the war left exchange in a bad way so that any product produced under Canadian costs and paid for with American money gets a big extra profit. On Okanagan apples they put a "prohibitive" tariff, but the exchange was so bad that they actually got a profit of 10 cents a box out of shipping them to New York this year, from the exchange rate alone, over the tariff.

It is just that way with baked products. They can bake them in Canada so cheaply, counting in the extra profit in exchange, that Canadians are flooding the border cities with Canadian bread, pies and cakes.

The situation has thoroughly alarmed the New England bakers. They have passed resolutions to the effect that baked products must have a tariff as effective at least as the tariff on flour. Otherwise they say the blind zeal of the law makers in shutting out Canadian wheat while letting in Canadian bread, will drive the New England baking industry to the wall.

Hugh V. Keiser, president of the New England Bakers' Association, has forwarded to all New England members of congress copies of resolutions calling attention to the folly of the law that injures our bakers without helping our farmers or anybody else.

One queer part of this situation is that Canada imposes a duty of 20 per cent on American bread so that competition on the other side of the border is automatically made impossible. The unfairness of the situation is all on one side.

(Continued from preceding page,  
column 3)

\$45; that "Old Timer" ought to pay double Pullman fares for his traveling salesmen and double railroad fare as well; and that "Old Timer" ought to meet some of the bills that bakers have to for plumbing repairs, building additions and overhead in general, including double bills for coal. "Then," said H. E. Barnard, Director of the Institute, "Old Timer" would see why flour and shortening amount to 41 per cent of the cost of a loaf; labor to over 21 per cent, selling and delivery to 22 per cent and administration expenses to 7.11 per cent. And he would see why coal and gas and transportation expense must come down for bread as well as for any other kind of 'Normalacy'."





# ALMONDS

TO BE TARIFF TAXED FOR A LAND BOOM

See article on the Agricultural Bloc's plans for Prohibitive Tariff on Nuts for the meaning of this land speculator's advertisement

—From an advertisement in the Chicago Tribune

it may sometime be highly advantageous to set a minimum protein, vitamin or mineral content for bread. But these ideals are for the future. They would be of little service today.

However, the baker may well set up certain standards and definitions which will enable him to judge the character and quality of his product. The volume of a well made pound loaf of certain definite qualities may readily and advantageously be set. The color of the crust and crumb, the grain and texture, the flavor and odor of an ideal loaf may be determined with considerable definiteness as conditions to strive for.

Such an ideal will in no sense standardize bread or remove the incentive which now urges the baker to improve his product. It will help to establish a higher plane of quality to which bakers' bread may be lifted.

When such definitions have been agreed upon it will be possible to adopt a plan or system for measuring bread quality. In the past bread has been judged in competitions and in comparisons with other loaves by the use of many different systems, usually called score cards. Some twenty years ago Miss Bevier, director of the Household Science Department of the University of Illinois, with Mrs. S. Nobel King, president of the Woman's Department of the Farmers' Institute, devised a score card for use in judging the character of bread, which later was published and used in determining the relative quality of bread exhibited at fairs and institutes.

### Original Score Card of Miss Bevier

Flavor .....	35
Lightness .....	15
Grain and Texture .....	30
Crust { Color Depth Texture } .....	5

Crumb { Color Doughiness } .....	5
Shape and Size .....	5
Moisture .....	5
Total .....	100

This score card has been modified and changed to meet the ideas of judges and teachers and today many different systems are used for scoring bread.

### Revised Score Card of Miss Bevier

General appearance .....	20
Size (5)	
Shape (5)	
Crust (10)	
Color	
Character	
Depth	
Flavor .....	35
Odor	
Taste	
Lightness .....	15
Crumb .....	30
Character (20)	
Coarse—fine	Texture
Tough—tender	
Moist—dry	
Elastic or not	
Color (5)	
Grain—Distribution of gas (5)	
Total .....	100

The score card of the Bureau of Chemistry, U. S. Department of Agriculture is in a sense the official system.

	Per Cent
1. General appearance:	
Shape .....	5
Smoothness of crust .....	5
Depth and evenness of color .....	5
2. Lightness .....	10
3. Crust:	
Thickness .....	5
Quality (crispness and elasticity)....	5
4. Crumb:	
Color .....	10
Texture (size and uniformity of cells, thinness of cell walls) .....	15
Elasticity (softness and springiness)..	15
5. Flavor (taste and odor) .....	25
Total .....	100

A number of other score cards are of interest.



*Kinne and Cooley Score Card*

(As published in Food and Household Management)

**Bread Score Card No. 1**

I. General Appearance .....	15%
1. Shape .....	2.5%
2. Size .....	2.5%
3. Crust .....	10.0%
a. Color	
b. Smoothness	
II. Internal Appearance .....	55%
1. Depth of Crust .....	10.0%
2. Texture (Lightness) ..	15.0%
3. Crumb .....	30.0%
a. Moisture	
(Elasticity) (25%)	
b. Color	(5%)
III. Flavor .....	30%
	<hr/> 100%

**Bread Score Card No. 2**

I. External Appearance .....	20%
1. Shape .....	5%
2. Size .....	5%
3. Crust .....	10%
a. Color	
b. Smoothness	
II. Internal Factors .....	50%
1. Depth of crust .....	10%
2. Texture .....	20%
3. Crumb .....	20%
a. Moisture (15%)	
b. Color	(5%)
III. Flavor .....	30%
	<hr/> 100%

*University of North Carolina***No. 92**

Score Cards for Judging at Fairs

Score Cards for Home Economics Products (Prepared by Division of Home Demonstration Work)

**Bread**

	Per Cent
1. General Appearance .....	20
Shape .....	5
Size .....	5
Crust .....	10

2. Flavor .....	35
Taste and odor .....	35
3. Crumb .....	30
Texture and grain .....	15
Moisture .....	10
Color .....	5
4. Lightness .....	15
Total .....	<hr/> 100

*University of Nebraska Food***Circular No. 22****Score Card for Bread**

	Per Cent
General Appearance .....	15
Color	
Size	
Shape	
Crust .....	10
Depth	
Crispness	
Crumb .....	35
Color	
Grain	
Lightness	
Elasticity	
Moisture	
Flavor .....	40
Odor	
Taste	
	<hr/> 100

*Ohio State University Circular***No. 6**

Making Yeast Bread

**Bread Score Card**

	Per Cent
Shape and Size .....	10
Lightness .....	15
Flavor .....	35
Grain and Texture .....	20
Crumb { Color	
Moisture } .....	10
Crust { Color	
Texture } .....	10
Depth } .....	
	<hr/> 100

*University of Tennessee Publication No. 51*

Score Card

	Per Cent
I. General Appearance .....	20
(a) Size .....	5
(b) Shape .....	5
(c) Crust .....	10
(1) Color .....	4
(2) Character .....	2
(3) Depth .....	4
II. Flavor .....	35
(a) Odor .....	17½
(b) Taste .....	17½
III. Lightness .....	15
IV. Crumb .....	30
(a) Character .....	20
(1) Coarse or fine.....	5
(2) Tough or tender...	5
(3) Moist or dry.....	5
(4) Elastic or not.....	5
(b) Color .....	5
(c) Grain (distribution of gas)	5
Total.....	100

*The Massachusetts Agricultural College Junior Extension Series No. 6*

Massachusetts Junior Extension Home Economics Club Bulletin

Score Card

External Appearance .....	15
Color 5; size 5; shape 5	
Crust .....	10
Depth 5; texture 5	
Crumb .....	40
Color 5; grain 10; moisture 5; thoroughness of baking 10	
Flavor .....	35
	100

*Summers System \**

External:	
Volume .....	10
Color of crust.....	10
Glaze .....	10
Shape .....	10
Break .....	10

Internal:

Grain .....	10
Color of crumb.....	10
Flavor (aroma) .....	10
Taste .....	10
Texture .....	10
Total points.....	100

A comparison of the several systems of scoring bread used by the teachers of Home Economics, by the U. S. Dept. of Agric. and by colleges and schools of domestic science can hardly be made because of the lack of definiteness of the terms employed. Texture, volume, lightness and grain are evidently used with similar meaning by different score cards. Special weight is frequently given to such relatively minor matters as the shape of the loaf and the thickness or smoothness of the crust. The moisture content of the crumb is also given weight in some scoring systems.

In order to determine whether these score cards are adapted for use in judging commercial bread the American Institute of Baking sent a questionnaire to all members of the American Bakers Association.

The questionnaire follows:

Blank No. 1

1. What is your opinion as to the volume of the loaf? Do you regard the production of a loaf of large volume as the first consideration, or should this be subordinated to other qualities?
2. Is there any particular color of crust which you consider most desirable?
3. Does glaze, obtained by steam or other treatment, add to the selling value of the loaf?
4. What is the most desirable shape of a loaf of bread?
5. Does a "thread" or "shredded wheat" appearance add to the selling value of a split top loaf? Does

\* As used by J. C. Summers, School of Baking, Dunwoody Institute.



failure to "fill" detract from the selling value?

6. Should bread have a close grain or should bread be baked for volume without regard for the grain. (Also see No. 1.)
7. Should the color of the bread be dead white, or is there a shade of yellow or gray which is more desirable than white?
8. What flavor (aroma) is most desirable in a loaf of bread?
9. What taste is most desirable in a loaf of bread?
10. If practical, is it desirable to increase the protein and vitamin content of the loaf for the purpose of making it more nearly a balanced or complete food?

Name of Firm .....

Address .....

Questions answered by .....

#### Analysis of Replies

While it is impossible to tabulate all the replies received it seems advisable to summarize the results by indicating the number of bakers who concur on special features and by giving the preferences expressed for color, flavor and taste.

#### Question No. 1—Volume of Loaf

Volume not first consideration.....	
Should be subordinated by other qualities .....	
Strong sentiment for quality first...	90
Medium volume unqualified .....	2
Large volume for local reasons .....	4
Large volume desirable .....	3
Moderate volume .....	1

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100

#### Question No. 2—Color of Crust

Great differences in descriptive terms are noted for this characteristic of the loaf.

Golden brown .....	26
Bright .....	1
Rich golden brown .....	7
Dark without glaze .....	4
Healthy .....	3
Rich brown .....	7
Thin brown .....	1
Golden .....	12
Rich red brown .....	5
Brown .....	7
Reddish gold .....	1
Straw color .....	2
Not specified .....	2
Light brown .....	6
Chestnut brown .....	1
Cherry red .....	1
Russet brown .....	1
Varies with locality .....	2
No answer .....	2
Creamy brown .....	1
Medium brown .....	2
Light tan .....	1
Light mahogany .....	1
Color must appeal to eye, appetizing..	1
Pretty brown .....	1
None other than elimination of pale crust .....	1
Rich yellow .....	1
Between yellow and brown .....	1

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100

#### Question No. 3—Glaze

Yes: Unqualified .....	46
Yes: Qualified, dependent upon style, wrapping, character of trade, etc...	21
No: Unqualified .....	28
No: Qualified, dependent upon style, wrapping, trade, etc.....	5
Matter of custom .....	1

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## Question No. 4—Shape of Loaf

These questions are not readily classified. Much diversity of opinion exists; if there is any agreement there is a tendency toward an "oblong" loaf of bread, but this term is indefinite. The sizes of pans vary greatly.

## Question No. 5—Appearance of Loaf

Selling value of "thread" or "shredded wheat" appearance: Yes .....	72
Failure to "fill" detracts from selling value: Yes .....	38
Not answered .....	35
Do not make split top loaf .....	10
No to a and b (both questions): No ..	8
Not decided on question .....	1
No experience on question .....	1
Questions not answered .....	9

## Question No. 6—Grain

Close grain: Yes .....	85
Grain first consideration .....	2
Avoid extremes in texture .....	2
Sponge bread .....	2
Volume, grain, texture.....	1
75 per cent of bread close .....	1
25 per cent of bread for volume...	
Loaf baked for volume not as good eating qualities .....	1
Before war close volume, after war close volume .....	1
Volume most essential but strive for close grain .....	1
Medium grain .....	3
Loose grain .....	1
Bread should not be baked for volume	1

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## Question No. 7—Color of Bread

Creamy white .....	31
Color not important if you have flavor and taste .....	2
Not dead white, a little yellow	2
Shade of yellow, just off white .....	8
Nearly white, some yellow, no gray .....	1
Golden yellow .....	1
White with rich yellow tint..	1
Slight yellow, never gray...	7
Yellow and white on par....	1
Yellow and yellowish.....	2
Medium yellow .....	1
Reasonable shade of white, cream color just as attractive .....	1
Yellow brown .....	1
Pure white not essential ....	2
White .....	34
"Too white" is generally tough.....	1
No answer .....	2
Color does not harm flavor.....	1
Public suspicious of "dead white"...	1
Gray most popular.....	1
Gray not desirable.....	1

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## Question No. 8—Flavor (Aroma)

True wheat .....	34
Nutty .....	13
Sweet milk .....	1
Butter .....	2
Sweet .....	17
Grain .....	2
Malt .....	2
Rich flavor .....	4
Condensed milk .....	1
Milk .....	6
Pleasing .....	1
Flavor of pure ingredients .....	2
Wheat and butter .....	1
Potato flour .....	1
Fresh .....	1



Pleasant .....	1
Appetizing .....	1
Wheat and milk .....	2
No answer .....	10

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Question No. 9—Taste of Loaf

Nutty .....	13
Matter of opinion.....	1
Milk .....	5
Sweet .....	20
Wheat .....	17
No answer .....	11
Fresh and wholesome .....	3
Crust taste .....	1
Similar to odor .....	1
Salty .....	4
Grain .....	1
No importance if grain and appearance are good .....	1
Rich flavor .....	4
Between sweet and lactic acid .....	1
Semi-sweet .....	4
Pure ingredients .....	5
Real bread taste .....	3
No sourness .....	2
Taste for more .....	3
Malt .....	1
What public demands.....	1

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Question No. 10—Improved Nutritive  
Value

Yes: Without qualification .....	45
Yes: With qualification .....	22
No answer .....	10
No opinion .....	7
No .....	13
No: Qualified .....	3
Make its taste good and the public will eat more .....	1
Use the best ingredients and flour....	1

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The results of the investigation while not conclusive can be taken as the consensus of opinion of the baking industry as to the essential features of good bread.

In order to determine the methods used by bakers in scoring their bread the following inquiry was used:

Blank No. 2

Several systems are proposed for grading a loaf of bread. The most practical method seems to be some system of scoring the several attributes of the loaf. Will you suggest a system of your own, giving the proper balance between the various points considered? If you feel that either of the systems given below serves the purpose, please so indicate. If you consider any further points pertinent, add them to the list.

	System A	System B	Your system
External			
Volume ..	10	15	
Color of crust ..	10		
Glaze ...	10		
Shape ...	10		
Break ...	10		
		15	
Internal			
Grain ...	10	10	
Color of crumb ..	10	10	
Flavor (aroma)	10	15	
Taste ....	10	20	
Texture ..	10	15	
Total			
Points..	100	100	

You will notice that system A gives equal importance to external and internal characteristics, and throws no emphasis

on any one point. System B gives internal features a total of 70 points as against 30 points for external qualities. Furthermore, it throws the emphasis on flavor, taste and texture, grading the loaf 50 points on these three items alone. What is your opinion of the relative importance of these several points? Is this or any other system of scoring practical?

Eleven bakers used system A, the so-called Dunwoody score card. This system gives equal weight to the ten essential factors and external and internal factors have each a value of 50. Forty-one bakers used system B which gives internal factors a value of 70 and external factors but 30.

Thirty bakers using a score card of their own device gave external appearance 30 points, internal features 70 points.

These points are averaged as follows:

External	
Volume .....	12.5
Color of crust .....	8.5
Glaze, shape, break .....	9.0
Internal	
Grain .....	10.5
Color of crumb .....	9.5
Flavor (aroma) .....	15.0
Taste .....	20.0
Texture .....	12.5

Bakers gave different values to these several factors. One baker gave volume a value of 30, another gave this fact but five. The relative value of the color of crust ranged from 3 to 20 and the range in the composite factor of glaze, shape and break ranged from a maximum of 25 to a minimum of 5.

The relative values ascribed to the internal features also varied widely, the maximum being 20 and the minimum 5. There was less diversity of opinion as to the color of the crumb, most bakers giv-

ing this factor a value of ten. The variations fell between 5 and 15. The important factor of flavor (aroma) was given values from 10 to 25 and the equally important factor of taste ranged from 10 to 40. The factor of texture was more uniform, most bakers evaluating it at 10; the maximum figure rose to 25 while the minimum was 5.

There is a slight difference in the value of the several factors. System B gives volume 15 while the composite average is 12.5. System B gives texture a value of 15 while the composite value is 12.5. It can be safely assumed that a proper score card should give external appearance a value of 30, internal appearance 35 and flavor and taste 35.

### *The Following System Is Proposed as The American Institute of Baking Score Card*

External Appearance	
Volume .....	10
Color of crust .....	8
Symmetry of form .....	3
Evenness of bake .....	3
Character of crust .....	3
Break and shred .....	3
	12
	<hr/>
	30
Internal Characteristics	
Grain .....	10
Color of crumb .....	10
Flavor (aroma) .....	15
Taste .....	20
Texture .....	15
	<hr/>
	70

The February issue of "Baking Technology" will continue the discussion of The Ideal Loaf and How to Score It. The score card will be explained in detail and each feature fully defined.



# Colloid Chemistry in Baking

*Research Chemists Are Throwing New Light on Problem of Strength and Weakness of Various Flours*

NOWADAYS if one talks about the problems of the baker, there is always a reference to Colloid Chemistry. The old method of analytical attack on the problem of baking strength is at last giving way to a new technique and viewpoint which for want of a better name may be termed colloidal.

The baking laboratory is a splendid field of activity for the colloid enthusiast and this viewpoint has been of notable service to both the baker and the miller in helping them to a clearer idea of why certain flours are weak and others strong, the effects of fermentation and the whys of staleness.

The development of the colloidal point of view in the consideration of baking problems has brought a host of inquiries to the Institute regarding specific colloid problems of baking, what universities are giving courses in the chemistry of colloids with special reference to baking and milling, what are some of the best books on this subject and many others. The following list of books will be found useful as a guide to the general literature and is given in response to constant requests from chemists and others engaged in baking laboratories:

Emil Hatschek: "An Introduction to the Physics and Chemistry of Colloids." 116 pp. P. Blakiston's Son & Co., Philadelphia, 1919.

Jerome Alexander: "Colloid Chemistry." 90 pp. D. Van Nostrand Co., New York City, 1919.

Wolfgang Ostwald: "Theoretical and Applied Colloid Chemistry." Translated by Martin Fischer. 232 pp.

John Wiley & Sons, Inc., New York City, 1917.

W. D. Bancroft: "Applied Colloid Chemistry." 345 pp. McGraw-Hill Book Co., Inc., 1921.

Zsigmondy: "The Chemistry of Colloids." Translated by Spear. 288 pp. John Wiley & Sons, Inc., New York City, 1917.

Freundlich: "Kapillarchemie." 591 pp. Leipzig, 1909.

Wolfgang Ostwald: "Handbook of Colloid Chemistry." Translated by Martin Fischer. 278 pp. P. Blakiston's Son & Co., Philadelphia, 1915.

Bechhold: "Colloids in Biology and Medicine." Translated by Bullowa from second German edition. 464 pp. D. Van Nostrand Co., New York City, 1919.

The Svedberg: "Herstellung Kolloider Lösungen." 507 pp. Theodor Steinkoff, Dresden, 1909.

First, Second and Third Reports on Colloid Chemistry and Its General and Industrial Applications, by the British Association for the Advancement of Science. At H. M. Stationery Office, 128 Abingdon St., London S. W. 7.

Kolloid-Zeitschrift, is a special journal devoted exclusively to the problems of colloids. It has, for example, published the notable work of Ostwald and Lüers on the colloid chemistry of bread. The journal of Physical Chemistry contains a wealth of material of interest to the student of colloids, and the American literature on this subject is expanding rapidly. The National Research Council has organized a Committee on the Chemistry

of Colloids, for the purpose of correlating research and industrial developments in this field.

Colloid chemistry has not only a special interest for the baker, but for the brewer, tanner, dyer, manufacturer of rubber, starches, gums, sizes, gelatine, cements, celluloid, explosives, pharmaceuticals, soaps, varnishes, paints, saccharine products, malt extracts, etc.

When the chemists of these varied interests meet together in the days to come they will all gather around the colloid table for mutual inspiration.

### *Diabetic Bread*

THE American Institute of Baking has in progress a study of the requirements and standardization of bread and other bakery products intended for the use of the diabetic. It believes that there is a legitimate field for the baker in the production of "diabetic bread."

Authorities on diabetes and its treatment are favorable to the use of a standardized bread of uniform and satisfactory composition. More and more the treatment of diabetes is becoming a matter of hygiene and well regulated diet under competent direction. Patients are taught by their physician the essentials of nutrition, and how to determine the amount of carbohydrate that they can safely tolerate. Successful clinics have been established from this standpoint and quackery in the treatment of this disease is on the wane.

The baker who is interested in special breads and is willing to assume the responsibility of laboratory control will have a market for his product.

Here are the essential requirements for diabetic bread:

1. It must give the patient something that tastes like bread and yet contain but

a small quantity of carbohydrate and protein. If the carbohydrate is low and the protein is too high the bread will be misleading to the patient because of the fact that excessive protein may do harm not only in itself, but by supplying the patient with more calories or fuel value than is indicated.

2. Diabetic bread should be standardized and the net weight in grams, total quantity of carbohydrate, protein, fat, and the calculated fuel value (calories) in simple form plainly marked on the wrapper. Patients can then obtain the actual amount of carbohydrate they desire, by dividing the loaf into proportionate parts. For example, if the loaf contained 80 grams of carbohydrate then one-eighth of the loaf would represent 10 grams. A standard roll weighing approximately 30 grams or 1 ounce, and containing 7 to 10 grams of carbohydrates and 2 to 5 grams of protein would be of great value to a diabetic. Such standardized bread or rolls would be particularly of service to those who travel. These products may be counted on gradually to make their way into the larger hotels and restaurants where they will be eagerly accepted by those requiring them.

Recent surveys of commercial "diabetic" food show an amazing number of products varying widely in composition and quality, but there is still room for an honest and properly standardized bread. The modern tendency is not "What is a diabetic food?" but "Is it properly standardized?"

The physician and patient have every right to require a statement of weight, composition and fuel value which is an honest expression of fact. The American Institute of Baking is prepared to give the baker assistance in developing a standard bread for diabetics.



# Court Stops Misbranding

*Its Decision in Egg Noodle Case Indicates Watchfulness  
of Bureau of Chemistry's Inspectors*

THE F. A. Martoccio Macaroni Company of Minneapolis labelled its product "Quality Brand Egg Noodles made from Semolina and Eggs" and then made the mistake of selling it outside the state.

The federal inspectors came along and took samples at Tacoma, Washington, the food chemists analyzed the noodles and found that they weren't noodles but were adulterated because "a product deficient in eggs had been mixed and packed with, and substituted wholly or in part for egg noodles." And they found that the label "Egg Noodles" was false and misleading and "deceived and misled the purchaser when applied to a product deficient in eggs."

So the court ordered the manufacturer to take back his noodles and label them correctly. Hereafter when noodle lovers buy Martoccio products they will get real noodles made with egg or they will know that they are just "Plain Noodles."

The whole story, with its moral to manufacturers who would misbrand and adulterate, is told in case 9581, Service and Regulatory Announcements of the Bureau of Chemistry.

Case 9568 is even more interesting to the baker, for it relates the misadventures of 2,400 packages of "Lemon Flavor Pie Filling" shipped by the Jewel Tea Company from Chicago to Minneapolis.

The Federal Court seized and condemned the whole shipment on the ground that the article was adulterated for the reason that an artificially colored product consisting essentially of corn-starch, sugar, gelatin, and citric acid, and containing no eggs, had been mixed and packed with, and substituted wholly or in part for, the said article, and for the further reason that it was mixed in a manner whereby damage or inferiority was concealed.

Misbranding was alleged for the reason that the statement on the label, "Lemon Flavor Pie Filling," was false and misleading and deceived and misled the purchaser, and for the further reason that the said article was an imitation of, and was offered for sale under the distinctive name of, another article.

It is the business of the Bureau of Chemistry to protect the baker who buys pie fillings and the consumer who likes noodles. And the inspectors and chemists are always on the job.

## A New Statistical Request

HOW important is the baking industry, which is now being harried by badgering comment from all sides by people who would see every other consideration cast aside in favor of a one-price—a bread-rock-regardless-of-quality price, for a standardized loaf?

We hardly knew we were seventeenth in importance when a new census found we were seventh. Now William M. Stewart, Director of the Census, is forwarding schedules to all bakers in common with all other manufacturing industries. He wishes information for statistical use.

The fullest possible response is what is called for.

How important the industry now is is suggested by these figures from the latest census to be compiled. It is that for 1919.

Number of establishments.....	24,919
Persons engaged in manufactures	159,283
Proprietors and firm members	27,779
Salaried employees .....	24,253
Wage earners (average number) .....	107,251
Primary horsepower .....	136,677
Capital .....	\$417,017,457
Services .....	168,885,548
Salaries .....	168,885,548
Wages .....	132,171,264
Materials .....	610,105,001
Value of products.....	954,875,753
Value added by manufactures..	337,750,752

Growth since 1919 will make the 1922 returns, if fully made, a record breaker.

### *Oust Disguised Pickets*

**R**ECENT experiences of the Federal System of Bakeries of Tacoma, Wash., in maintaining its right to operate on open shop, are interesting, both as to the successful outcome of the fight and the basic conclusion set out by the court in its finding that picketing is unlawful.

The plaintiff who operates a wholesale and retail bakery refused to sign a contract providing for a closed shop although it agreed to pay union wages and run union hours.

The union called a strike in the course of which pickets were stationed in front of the principal shops of the plaintiff, ostensibly to sell the weekly newspaper published by the Tacoma Central Labor Council, but in fact for the purpose of advising customers that the store was unfair to organized labor.

The court after hearing the evidence presented in the action finally brought by the bakery proprietor to establish his right to conduct his business without interference, issued an injunction restrain-

ing any man or any member of the Central Labor Council or the Bakers' Union from picketing. In his discussion of the arguments the judge said, "There is no question in the mind of the court but that this man down there was picketing the place. Everybody living in the city of Tacoma knows that this place is not a street corner or a place that anybody would recognize as a news stand."

It is evident that the courts are not only recognizing the principles laid down by the Supreme Court as to picketing, but that they are not being misled in their interpretation of what constitutes picketing.

### *From Beer to Bread*

**T**HE alchemy of time, catalysed by the enactment of the Eighteenth Amendment, has wrought a magic transformation at the Wahl-Henius Institute of Fermentology.

The temple of Gambrinus has been rededicated to the study of the Staff of Life.

Fluid extracts of the cereals have entered a more solid phase and the fermentation of starchy materials is now carried on in the dough trough instead of in the vats in the fermentation cellars.

The story of the utilization of the world famous School of Fermentology as a research institute and school for bakers is admirably told in the bulletin "From Beer to Bread" recently put out by the Publicity and Advertising Committee of the American Bakers Association by W. E. Long, its chairman.

Copies of "From Beer to Bread" have gone to every member of the American Bakers Association. Additional copies are available for distribution and may be had by application to the association, 1135 Fullerton Ave., Chicago.



### *How to Get Wines for Baking*

FOR centuries bakers have used alcoholic fruit juices in the manufacture of their products. The fine flavors of cakes and pies are enhanced by the addition of heavy wines. It is not the purpose of the Federal Prohibition Agent to prevent the legitimate use of these baking accessories. The bakers, however, find it difficult to replenish their stocks. The following instructions have been given the American Bakers Association by the Federal Prohibition Commissioner and, if carefully followed, the baker can secure wines and similar products for baking purposes. The following procedure is suggested:

Application for the use of wines, etc., should be made to the Federal Prohibition Director of the state in which the baker resides. The application should be made out on Form No. 1404, a copy of which can be secured from the Federal Prohibition Director or from his local representative. Supplement Form No. 1404 should also be secured for the purpose of listing the formulas the baker proposes to use. After the application has been filled out some time is necessary before it is passed upon and the permit issued. The length of time varies from two weeks to two months. After the application has been approved, the baker may secure a total quantity of twenty gallons a year without furnishing bond. If, however, the baker wishes to use more than this amount, it will be necessary for him to furnish a thousand dollar bond which will entitle him to a maximum of one hundred gallons every three months or a total of four hundred gallons for the year. Where the bond is furnished and the larger amount of spirits called for, the officials charged with the enforce-

ment of the act will make an inspection of the plants of the bakers to whom the permit has been issued.

### *Last Call for Our Accounting Systems*

WHEN the Association established a department of Statistics and Accounting it struck an instant cord of responsiveness. The systems have been completed some six months and in that time 44 of the 100 sets of the "A" system, 23 of the 50 sets of "B", 9 of the 30 sets of "C" and 10 of the 15 sets of "D" have been sent out to bakers. They are now in use. We can be well pleased with a project that has already introduced accurate and standardized cost accounting systems into 86 bakeries.

The trade papers have given the Association plan the widest publicity and though the initial interest in it has reached a state of normalcy, every mail brings new inquiries concerning it. Four hundred and thirty-nine inquiries have reached the office, from forty-three states, Canada, the British West Indies, New Zealand and Hawaii. The widespread demand for the cost accounting systems confirms the belief that the Baking Industry is not only coming out of the darkness into the light, but indeed that it is already far advanced in the list of well organized and carefully managed industries.

Fifty-six sets of the "A" system, 27 sets "B" system, 21 "C" systems and 5 "D" systems are still available. We hope to distribute every set before the year is over. If you need a cost accounting system or know of a baker who could use one with profit, won't you write for full information concerning it to Department "C," American Bakers Association, 1135 Fullerton Ave., Chicago.

## Books for the Baking Laboratory

### The Determination of Hydrogen Ions

An elementary treatise on the hydrogen electrode, indicator and supplementary methods with an indexed bibliography on applications. W. Mansfield Clark. 318 pp. Williams & Wilkins, Baltimore, 1920. Price \$5.00.

THIS pioneer book by Dr. Clark is of distinct interest and importance to the baking chemist. Written primarily for biologists and biological chemists it should also find a distinct place in the technical libraries of many industries of which baking is a striking example.

The baking chemist has only recently begun to grasp the possibilities that lie in these new conceptions of what he has generally termed "acidity." Its technique and terminology are comparatively unfamiliar to him, and it is a difficult matter to keep pace with the research laboratories who lead the way in clarifying our knowledge regarding "flour strength," fermentation, or enzyme action and bread infections.

Pasteur very early in his work recognized the importance of the careful control of acidity in fermentation processes. "Had Pasteur and doubtless others of his discernment relied exclusively upon volumetric determinations of acidity he would have certainly fallen into the pitfalls which at a later date injured the faith of the bacteriologist in the chemist. At all events he recognized distinctions which we now attribute to hydrogen ion concentration."

Our present knowledge of the effects of hydrogen ion concentration has been in a large measure due to the impetus given such studies by Sorensen of the Carlsberg

Laboratory in his ingenious development of technique. Many practical baking chemists are now familiar with the work of Jessen-Hansen on the influence of hydrogen ion concentration on the baking value of flour, which is a direct outcome of Sorensen's work.

This study has had a marked influence on the work of others, such as Henderson of Harvard and his co-workers who during the period of the late war made several contributions of distinct value to the baking industry on the control of rope and flour strength.

Gortner and Bailey of the University of Minnesota, in their studies of strength, have further developed the hydrogen ion conception and technique; Sherman of Columbia, in his enzyme studies which are of unusual importance to the baking chemist are but a few of those whose investigations are of decided interest to the baking industry.

Dr. Clark has given us a book which will occupy an enviable place in the literature of this subject. Seven chapters are devoted to a consideration of indicators and colorimetric methods and eleven to the electrometric technique. A very comprehensive chapter follows with a bibliography of over 1,200 titles. Useful tables and a list of electrometric equipment are to be found in the appendix.

Dr. Clark's work is the first American contribution to the general literature of this subject, and presents in English what has been formerly only available in such works as Michaelis in German. The baking chemist should add this book to his library.



## How Stored Flour Changes in Weight

EVERY baker knows that flour loses weight in warm, dry storage and gains weight in humid weather. These changes have been studied by experts in the Bureau of Chemistry and summarized as follows: "Data found in the literature indicate that the changes in weight of flour varies widely depending on the storage conditions.

"Computations based on this data indicate that wheat flour with an original moisture content between 12.22 per cent and 13.39 per cent, stored in an open com-

mercial warehouse at an average temperature between 33 deg. and 61 deg. F., and an average humidity between 66 and 74 per cent would show a negligible change in weight, and that greater changes might be expected, the further the deviation from these conditions.

The American Institute of Baking will conduct experiments to determine the gain or loss in flour stored under conditions where the temperature and humidity changes are wider than those referred to in the official investigation.

## Unfair Express Rates

FOR the first time in its history the American baking industry now has a central committee at work under Harry D. Tipton, of New York, on the matter of unfair express rates. They are appealing to the Interstate Commerce Commission against the obvious unfairness of a rate on shipped bread which, while apparently 25 per cent under the standard rate, is actually 10 to 15 per cent higher than the standard.

The trouble comes from the fact that rates were fixed with 27½ per cent added to a basic rate to cover cost of picking up and delivering packages. In over 80 per cent of the bread shipments the baker delivers the bread to the express office and his customer calls for it at the point of final delivery.

Yet the 27½ factor still remains in the rate. The Association's committee is demanding the elimination of this part of the rate in all cases where bakers elect in writing to deliver their own bread to terminals and have their customers call for it at the delivery terminal.

If the Interstate Commerce Commission

yields its point bread will be freed from an unfair tax based on a service not rendered.

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### *A Coming Paper*

FOR two years Louys A. Rumsey has conducted researches in the laboratories of the American Institute of Baking to ascertain the influence of dietetic enzymes upon flour strength. His work is nearing a conclusion and the publication of his thesis upon this important phase of bread production is to be undertaken by "Baking Technology" in the near future.

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### *Wild Yeast*

A visitor to our new home who couldn't escape from his biological cast of mind, remarked as he saw baking ovens moved in where brewing vats had been:

"It's the eternal law of compensation. The dough pan was dispossessed out of the home to let the brewing kettle move in, so bread takes over the factory and the laboratory, and it's a fair exchange all around."

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Woman's Bldg.

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APR 8 1922

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association*

Vol. I

CHICAGO, ILLINOIS, FEBRUARY 15th, 1922

No. 2

## An Association Pledge Fulfilled

THE CONSTITUTION of the reorganized American Bakers Association pledges the Association to encourage the education of the baker. This pledge will be fulfilled by the American Institute of Baking.

To this end the Institute will conduct a school which will meet every need of the operative baker, the baking chemist and technologist, and the graduate in science who wishes to enter the baking industry.

In order to accomplish its aim, the School of the American Institute of Baking will be so organized that instruc-

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tion will be given along three lines.

1. It will give training to fit bakers to be better foremen and superintendents.

2. It will train men to act as control chemists in the baking or milling laboratory, in the purchase and use of the ingredients of bread, etc.

3. It will afford opportunity for men of considerable chemical and baking experience to engage in special problems of scientific research in the laboratories of

the School and Institute.

As soon as work is well under way in these courses, college graduates and others are invited to get in touch with



the School of Baking for the purpose of arranging for special work in the nature of postgraduate investigations which will give them an insight into the baking industry, and lead to positions of considerable desirability.

All of the regular courses will be followed shortly by similar courses which apply to the manufacture of cake as well as bread.

It is indeed a task to take an empty building and fit it on short notice for as pretentious an undertaking as has been just outlined. In our case, however, the bakers are very fortunate in the nature of the building which their association has taken over. It already contains classrooms and laboratories which can be used just as they are. In fact, if new ones were to be installed, they could not be better than those already available. We need, then, only to install a school bakery and to make slight modifications of facilities already at hand before the school is opened.

That it is the bakery which must be installed new, is indeed fortunate because it is here that we find the most vital point in the whole course of study in the regular bakers' course. Professor William Jago of England has already recognized its importance in his article on the American Institute School of Baking published in the *Bakers Helper* of January, 1922. He emphasizes the prime importance of the institute bakery, and he is very anxious to have the proper type of equipment and the proper policy of operation decided upon. This is of course logical as the entire instruction will center on the practical work in the shop.

However, actual shop practice, except for preliminary training in fundamentals, should be received in outside shops. If the student has not had the benefit of previous experience before coming to the

School of Baking, he will pick up the details of shop practice in the school bakery and then round out his manual ability through assignments to commercial shops about the city where he will come into contact with the conditions existing under competitive manufacture. The bakery of the School of Baking will be run almost entirely on the bases of experiment, demonstration of the effects of varying conditions and ingredients, and research.

The output of the bakery has not yet been determined. Sufficient bread will be produced so that the runs will be on a commercial scale, and normal conditions of bread manufacture will be preserved throughout. In fact, the school bakery will be equipped as if the purpose were to turn out commercial bread, and equipment in triplicate will be installed so that there will be three bakeries in one, and by the rotation of the use of this equipment, experience in the operation of all will be available.

Whatever the details of the courses are, certain fundamentals will be included and instructions in the following subjects will be given.

### *Subjects for Instruction*

#### 1. Commercial Manufacture of Bread

Receiving, handling, and storage of ingredients.  
Measuring, weighing, and blending ingredients.  
Mixing practice and dough room practice.  
Making up practice, both machine and hand.  
Proofing practice, both automatic and otherwise.  
Oven practice.  
Cooling practice.  
Wrapping bread.  
Shipping and sales practice.  
Experimenting with variations, both proper and improper, in formulas and manufacturing processes. Every dough will be an experimental one.

#### 2. Experimental Baking Laboratory.

The various "recognized" methods of conducting the experimental baking test.  
Experimenting with variations in formulas and manufacturing processes; with different flours used alone and blended; with dif-

ferent sugars; different shortenings; yeast foods, etc., etc. This work will parallel the work done in the school bakery, but because of the smaller size of the doughs and the larger number which one man can run at one time, a greater range of work will be done.

Control of the ingredients and processes used in the school bakery.

Baking bread with flour manufactured in the experimental mill of the school.

Problems of research connected with the investigation of new methods of manufacture.

Demonstration of various principles and practices.

### 3. Chemical laboratory of the School of Baking.

Training in simple analytical procedure.

Routine testing of flours, sugar, milk, salt, yeast, water, etc., according to special A. I. B. methods of analysis.

Investigations of the nature and properties of the various ingredients of bread doughs.

Studies of malt products, etc., with special reference to the action and control of enzymes.

### 4. Special work and lectures.

The relation between the employer and the employee.

Bonuses, strikes, social features, etc.

Legal relations of the baker.

Weight laws, wrapping laws, sanitary laws, material standards, business law, leases, workmen's compensation laws, etc., etc.

The nutritive value of bread.

Bookkeeping and cost accounting for the baker.

Electrical information of interest to the baker.

Mechanical information of interest to the baker.

Refrigeration machinery of interest to the baker.

Temperature and humidity control in bake shops.

The microscope and its use by the baker.

Flour mixtures, determination of strength of yeast, examination of molds, bacteria, etc.

Fuels and their relation to combustion with special application to the firing of bake ovens.

The manufacture and properties of all materials handled in a bakery.

The metric system of weights and measures.

Water and its treatment.

Bleaching of flour.

Baker's machinery, its use, care, installation, etc.

Blending flour.

Yeast foods.

Records in use in the shop.

Special commercial shop problems, met with by foremen and superintendents on the job. How to solve them.

Bread troubles, and their solution.

Rope, what it is, how to prevent it, how to eliminate it, how to prevent its recurrence.

Sour bread.

The five fermentations, and their control.

Special lectures by prominent men on problems of the hour.

### *When Classes Start*

The first class for bakers will start on Monday, May 15th, and continue for four months, closing September 2nd. In order to do justice to all the men enrolled, the number to be admitted has been set at 36. All who apply after this number has been accepted may take the work during the second term for 1922, which will be from Monday, September 4th, until December 23rd.

### *The Faculty*

A faculty of nationally known men with previous experience in the training of bakers is being collected. In addition to the full-time members of the faculty of the Baking School, all members of the staff and advisory committees of the American Institute of Baking are available for special lectures, and men of prominence who from time to time pass through Chicago will be called on to address the class on problems of the day. In this way and by shop visits throughout the course as well, the class will receive the latest information of interest to them.

### *The Cost*

Tuition for the course has been set at \$300.00 for the four months bakers' course. Other special courses will be given at terms to be arranged for in each case. It is figured that the total cost to a visiting student, in addition to his tuition, will be about \$100.00 per month.

Applications for enrollment are now being received. Those who desire to be with us at the start should secure their places soon, by writing to Peter G. Pirrie, Principal, The American Institute School of Baking, 1135 Fullerton Avenue, Chicago.



# Sees Need for Trained Baker

*Noted Public Health Authority Adopts American Institute's  
Score Card for Louisiana Bakeries*

“MEN have been entering the baking industry who had no business to enter it. I feel that a man has no more right to enter the business of baking bread for the people without qualifying before adequate judges than a man has the right to dispense medicine or practice law without adequate preparation.”

In the above words Dr. Oscar Dowling, president of the State Board of Health of Louisiana, which has the power to disqualify bakers in that state, spoke up as to the future policy of his Board.

Dr. Dowling spoke in the new home of the American baking industry at 1135 Fullerton avenue, Chicago. He spoke in praise of the School of Baking which is soon to be opened, and with a wide realization of the problems of nutrition the students of this school must try to solve.

All that he said was a preface to his final declaration that the new baking school opened a new era for food consumers in America. He spoke charmingly of the old French bread of New Orleans which became nationally famous for its flavor and texture. And he hoped for the day when baking chemists could perfectly reproduce it in the exact quality that the master bakers of the old régime in New Orleans could produce.

The vitamin-killing method of making soda biscuits Dr. Dowling deplored as one of the evils to the sad significance of which the South must be aroused.

And concerning the improper baker, there were many plans which Dr. Dowling suggested for his elimination. For one thing he proposed to adopt in Louisiana the same identical score card for bakeries

that appeared in the January issue of Baking Technology.

The score card there published was proposed by Dr. Samuel C. Prescott, head of the Department of Biology and Public Health of the Massachusetts Institute of Technology. Thus New England in the far northeast of America has worked out a problem identical with one that has troubled Louisiana in almost the extreme end of the Old South.

“I am adopting this score card,” Dr. Dowling explained, “because America needs uniformity in baking standards and if New England is moving in this direction we in Louisiana can well afford to help along.

“It just happens that we are revising our Sanitary Code and we can put this score card into the revised code without any legal difficulties. The matter is now open.”

One story of an unfit baker in Louisiana who found his investment all in vain, merely because of a sheer ignorance of the principles of sanitation and the letter of the law, illustrates the background from which Dr. Dowling judged the American Institute's school to be an important gesture towards the future.

“I hated to close up the shop of a young man who thought the baking business was a good one to enter,” he said, “but I found after investigation that there was nothing else to do.

“The young man in question decided to open his bakery in a part of his home. In finding rooms he installed a mixer on one side of a bath room and an oven on the other side. The bath room was that used by the whole family although the

other living quarters had no connecting doors with the baking quarters.

"You can see what possibilities there were in this situation for the spread of communicable diseases and bad sanitary conditions.

"When we got after the young man he claimed the family did not use this bath room but it was the only bath room available to them so we merely laughed at his explanation.

"We explained some provisions of our Sanitary Code. These had been in force since 1910. They provided that operators must have always available the means of washing their hands; that smoking was not to be allowed on the premises; that surface water could not be used; that stables must be at least 50 feet from the baking premises; that flour and materials must be stored in rat proof rooms away from walls, with the lowest bags at least 18 inches above the floor; that all dough mixing and baking rooms must be screened and free from flies.

"We asked the young man who had ventured his all as a baker, if he knew the law in these respects. He pleaded that he had been ignorant of it.

"We asked him what he knew of the dangers of allowing a family bath room in a bakery. He sensed none of them.

"Reluctantly we had to conclude that he was one of those who had no adequate comprehension of what he was doing when he tried to enter the baking business. We had to close him out. And that is why we consider your school a very material contribution to the future of your great industry."

Dr. Dowling has no mean opinion of the qualities of a good baker, or the public necessity of allowing only good bakers to bake bread. He spoke tearfully, almost, of the "heavy" muffins and the "soggy" corn bread for which he was

"overcharged" at 15 cents a portion on the dining car of the Panama Limited which brought him to Chicago. He told of finding bits of filth in the bread of cellar bakeries until he had made a drive against them as a class.

And he told of the love of hot bread in New Orleans, which he was doing his best to break up, because when wrapped too soon after baking such bread became "sweaty, slimy, and sloppy."

And bread is only one of the fields in which this energetic health officer is hard at work. He is teaching farmers milk sanitation, and city folk bread-and-milk wisdom.

The final wish he expressed as he left the Institute was that oystermen of the South Atlantic coast might have just such an institute to teach the science of oyster culture and oyster handling. He would even like to see such an institute expanded until it should take in the whole of the fishing industry.

"The future," he said, "is a day of marshaled industries behind your food chemist, your sanitary expert, and your builders who work for the industry as a whole. I preach against cheap milk in Louisiana because I want every farmer to have enough money out of his milk to build the best of sanitary barns and feed the most nutritious foods to his cattle. Bread too must return to the baker enough to enable him to bake it in the most sanitary bakeries that can be constructed.

"I do not say this with the good of the baker alone in mind. The good of the people as a whole is what I am thinking of. Between a living profit that will keep the baker going and a low price that only heads him towards the wall, I am in favor of conditions making for continuity and improvement of the industry."



# Wholesome Baking Materials

*A List of Products Which Have Been Tested and Registered by the American Institute of Baking*

ONE of the most important services that the American Institute of Baking seeks to render the baking industry is that of protecting its members from the use of fraudulent and dishonest products.

This service takes the form of examining and testing all ingredients for bread submitted to the Institute's laboratories, and registering those that satisfactorily pass all tests.

These tests are made with the health and welfare of bread users in mind, as well as the success of the baker who may be deceived by manufacturers' claims. Since the plan was first put into operation in April, 1921, the Institute's bulletins No. 4 and No. 6 have been issued, outlining the plan in full and giving those products examined and registered up to September, 1921:

A complete list of all products so far registered is printed herewith. Additions to the list will appear in successive numbers of Baking Technology as they are admitted after thorough tests.

Registration by the Institute of a product assures the baker that it has been examined in the Institute laboratories by appropriate analytical and baking tests; has satisfied statements of composition and technical applications made by the manufacturer and does not conflict with the legal standards.

The registration of approved products is the direct outcome of constant inquiries from bakers, manufacturers, students and others regarding the quality, composition, desirability and application of various products intended for use in bread making.

It has been emphasized in this bulletin that there is a wide variety and increasing number of commercial baking ingredients offered for sale to the baker. Many of these products have stood the tests of experience, are carefully controlled in composition and their applications have become general trade knowledge. This statement, however, does not characterize or include many of the products now on the market and for which there is no authentic information except manufacturers' claims or other prejudiced data; for this reason any plan other than a comprehensive survey of the wide field of baking materials would be unjust alike to both the baker and the manufacturer. It would be manifestly unfair to publish indiscriminately analyses and baking tests of selected material.

The registration plan aims to cover the entire field of baking materials. It has, for example, made a beginning in its investigation of malt products and shortening agents and is registering milk products. As the work progresses other classes of baking material will be examined so that finally the baker will be in possession of a thoroughly representative list of baking materials of dependable quality and value.

The federal and state food laws exercise a strong and restraining influence on the wilful adulterator and misbrander of foods. In a similar way the publication of products approved by the Institute in accordance with the registration plan is an effective method of protection for the baker. It gives him a list of reliable products as a guide to purchase, and ex-

cludes illegal and misrepresented materials from his consideration. It is of un-  
 ceive favorable recognition without preju-  
 dice. This service is given without cost

## Reliable Products

*As Registered by the American Institute of Baking*

Laurel Cooking Oil.....	Wilson and Co., Chicago, Ill.
Wilsco X Cocoanut Oil.....	Wilson and Co., Chicago, Ill.
Wilsco XX Cocoanut Oil.....	Wilson and Co., Chicago, Ill.
Peanut Oil.....	Wilson and Co., Chicago, Ill.
Corno.....	Wilson and Co., Chicago, Ill.
Colonial Cooking Oil.....	Wilson and Co., Chicago, Ill.
Bakers' Lard.....	Wilson and Co., Chicago, Ill.
Butchers' Lard.....	Wilson and Co., Chicago, Ill.
Wilsco Shortening.....	Wilson and Co., Chicago, Ill.
Laurel Pure Leaf Lard.....	Wilson and Co., Chicago, Ill.
Advance Shortening.....	Wilson and Co., Chicago, Ill.
Certified Pure Lard.....	Wilson and Co., Chicago, Ill.
Florolene.....	Ward Baking Co., New York City, N. Y.
Bakers' Special Pure Lard.....	Swift and Co., Chicago, Ill.
Silverleaf Brand Pure Lard.....	Swift and Co., Chicago, Ill.
Premium Kettle Rendered Pure Lard.....	Swift and Co., Chicago, Ill.
Cotosuet.....	Swift and Co., Chicago, Ill.
Golden Cooking Oil.....	Swift and Co., Chicago, Ill.
Peerless Cooking Oil.....	Swift and Co., Chicago, Ill.
Bakers' Pastry Oleomargarine.....	Swift and Co., Chicago, Ill.
Bakeall Oleomargarine.....	Swift and Co., Chicago, Ill.
Kakebake Oleomargarine.....	Swift and Co., Chicago, Ill.
Jewel Shortening.....	Swift and Co., Chicago, Ill.
Puffrite.....	Swift and Co., Chicago, Ill.
Mrs. Tucker's Shortening.....	Interstate Cotton Oil Refining Co., Sherman, Texas
Scoco.....	Southern Cotton Oil Co., New York City, N. Y.
88 Oil.....	Southern Cotton Oil Co., New York City, N. Y.
22 Oil.....	Southern Cotton Oil Co., New York City, N. Y.
Wesson Oil.....	Southern Cotton Oil Co., New York City, N. Y.
Sweet Clover Brand Pure Lard.....	Henneberry and Co., Arkansas City, Kansas
Ark Brand Leaf Lard.....	Henneberry and Co., Arkansas City, Kansas
Capreco Shortening (White Dome).....	Capitol Refining Co., Washington, D. C.
Capreco Shortening (Shortolene).....	Capitol Refining Co., Washington, D. C.
Potomac Cooking Oil (Yellow).....	Capitol Refining Co., Washington, D. C.
Caprecorn Cooking Oil.....	Capitol Refining Co., Washington, D. C.
Aco White Cooking Oil.....	The American Cotton Oil Co., New York City, N. Y.
IXL Cooking Oil.....	The American Cotton Oil Co., New York City, N. Y.
Boar's Head.....	The N. K. Fairbanks Co., New York City, N. Y.
Snowwhite.....	The N. K. Fairbanks Co., New York City, N. Y.
Fairco.....	The N. K. Fairbanks Co., New York City, N. Y.
Hermitose Crystal Maltose Syrup.....	Frankfort Grain Products Co., Frankfort, Ky.
Hermitose Amber Maltose Syrup.....	Frankfort Grain Products Co., Frankfort, Ky.
Blatz Malt Sugar Syrup.....	Val. Blatz Brewing Co., Milwaukee, Wis.
Bakers' Malt.....	La Crosse Refining Co., La Crosse, Wis.
Diasto.....	H. C. Schrank and Co., Milwaukee, Wis.
Fermentone.....	Pabst Corporation, Milwaukee, Wis.
Fermentive.....	Arnold Wahl Malt Syrup Co., Chicago, Ill.
Diamalt.....	American Diamalt Co., Cincinnati, Ohio
Bakers' Malt Syrup.....	P. Ballantine and Sons, Newark, N. J.
O. P. Malt Extract.....	Malt-Diastase Co., New York City, N. Y.
120 Degree Malt.....	Malt-Diastase Co., New York City, N. Y.
Freihofer's Superior Malt Extract.....	Freihofer Baking Co., Philadelphia

usual interest to the manufacturer as the means by which honest products can re-  
 and is not in any sense operated with a view to capitalizing trade interests.

(Continued on page 40)



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entry in the post-office at Chicago, Illinois, as second-class matter, applied for under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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FEBRUARY 15, 1922.

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### *Marshaling Our Industry*

**L**INE up the industries. Rank them according to the part they play in modern life. Value them as to their importance to mankind. Size up the burden of responsibility each one bears.

The farmer who grows the crops that feed the hungry world is number one in the front rank but at his right stands the man who makes the products of his broad acres into bread.

The baker of bread is well aware of the part he plays in society. He knows the value of his service. He feels the weight of his burden as the manufacturer of 500,000,000 bushels of wheat into wholesome loaves each year.

And this great industry is thinking straight because it does realize its responsibilities. It is working efficiently that its service may be the more helpful. It knows that

when it takes from the kitchen the mighty task of baking the nation's bread, it cannot make mistakes, it cannot fail to perform, it cannot avoid every responsibility which through long generations has rested heavily on the shoulders of the food preparer, the woman in the home.

And so this great industry is marshaling its forces. It is calling to every baker to line up under the same standard, to support the same high ideals, to fight for the same principles.

These ideals and standards are set out so clearly in the new constitution of the American Bakers Association that our industry may be marshaled for inspection behind ten dominant purposes.

Close ranks, bakers of America, and march forward behind these banners:

1. THE RESEARCH LABORATORIES OF THE AMERICAN INSTITUTE OF BAKING. In these laboratories the fundamental truths of flour and fermentation, of nutritive values and vitamins, are uncovered and new facts of the greatest importance to the human family laid bare.
2. THE SCHOOL OF BAKING in which the boys of today find the trained mind and the skilled hand which are the working tools of the baker of tomorrow. The time when mere strength—unenforced by the intelligent command of every raw material—can produce bread, is gone. The baker of today is a scientific manufacturer. The School of Baking is his training quarters.

3. **THE SERVICE LABORATORY** to which the baker brings his problems for solution. Flour can no longer be bought or sold intelligently unless its qualities are known both to the miller and the baker. Milk, shortenings, sugars, every raw material which makes up the dough batch, must meet the specifications of the modern shop superintendent. The Service Laboratory furnishes this information. And it tells the facts of the character of the water supply, of the oils, fuels, flavoring materials, colors, every ingredient of the loaf and material used in the shop.
4. **THE JOURNAL OF BAKING TECHNOLOGY**, which interprets for the baker the work of the research and service laboratories, and which is the voice of the industry in its call to the mother in the home to throw off forever the burden of bread baking. And through Baking Technology every ignorant assault on bread as a food is met and thrown back, every captious criticism is answered, every false rumor stilled. Baking Technology speaks for the baker in the halls of science. It places the baking industry in the class of scientific and technical industries.
5. **THE LIBRARY OF BAKING**, which assembles the literature of the industry and provides an inexhaustible source of data for the full story of bread. To the library will in time come every student of nutrition who is concerned with the study of man's best and cheapest food. And from it will flow in ever increasing volume the facts which every baker must know if he is to keep step with his fellows behind the high held standard of his industry.
6. **THE COST ACCOUNTING SYSTEM**, which is supplanting memory and guessing in operating the modern bakery. Through the systems of the American Bakers Association any baker, whether his business is counted in terms of single barrels of flour or by many carloads, may know his costs, his losses, his profits. The accounting systems are the measures by which business success is gauged. They are the absolute indices of success or failure.
7. **THE CODE OF ETHICS**, which gives each baker a map and chart of the course he must pursue to be true to himself and true to his industry. This code, like the law brought down from Mount Sinai, lays clear the duty of the baker to his fellow worker, to his industry, to the great family he serves. Followed with honest purpose it will lift him out of the reach of destructive competition, out of the abyss of labor misunderstandings, into the well deserved approbation of society.
8. **THE INSPECTION SERVICE**, which will create public confidence in the Sanitary Standards of the industry. This service, behind which is thrown the approval of the United States Public Health Service and of every public and private agency which is working in the interest of a purer, cleaner, more wholesome life, will insure to the bread consumer a superior food, made of sound materials, in sanitary shops, by healthy workmen. It will break down the last vestige of the old, old fear that bread drawn from the baking oven lacks in some way the qualities which have been idealized in bread baked in the kitchen of the home.
9. **THE INDUSTRIAL RELATIONS COMMITTEE**, which seeks to work out an



ideal relationship between the man in the office and the men in the shop, between employer and labor. This Committee will adjust disputes between competitors; it will hold both employer and employee to the sanctity of contracts; it will set up a system by which individual warfare, with all its waste and woe, may be replaced by intelligent action at the council table.

10. THE COMMITTEE ON PUBLIC RELATIONS, which will speak for the baker before legislatures, the Federal congress, every body which is charged with the regulation of the industry. It will work for honest bread weight legislation, for fair tariffs, for just rulings always. It will take to the people the problems which must arise in the process of making and distributing its most important food and with them work out just and fair regulations.

And so, under a strong leadership, armed with the weapons of honest purpose and high ideals held by trained men and reinforced by the skill of the scientist, the baking industry goes forth to its final battle—to sweep out of the home the burdening task of baking and raise aloft the banner of complete assurance in the perfectness of bread, the best food for all mankind.

—H. E. BARNARD.

### *Our Allied Fighters*

TEN HUNDRED and fifty-nine men, a full regiment of Gordon Smith's Allied Trades members,

are in the trenches fighting for the American Bakers Association. They are indeed "carrying the message to Garcia." They have the full facts of association activities. They know of the fight it is making against exorbitant tariffs on frozen eggs, nuts, raisins; against excessive freight and express rates, against unfair trade practices.

They know of the School which will be open in the Spring for training the boys who will be the bakers of the future, they know of the Service Laboratories which are analyzing flour, shortenings, milks—all the materials the baker uses, and they are interested in the work going on in the Research Laboratories where the wonderful properties of gluten and diastase, enzymes and hydrogen ions are being studied that some day the baker may have a better command over his raw materials than he has now.

And these men in the trenches know what the Code of Ethics stands for. They have read the challenge the Association throws out to the short-visioned men who refuse to work with their fellow bakers. They know too of the splendid stand the Sanitary Code takes for cleanliness, healthfulness, decency in every branch of the greatest of all industries, that of the baker who makes Bread, the Best Food For All Mankind.

## *Thou Shalt Not Lie*

**R**YE BREAD, brown bread, whole wheat bread, indeed every kind and sort of bread, has its own distinctive color. That color means something. White bread is white because it is made from highly purified flour; rye bread is dark in proportion to the amount of rye flour used in the dough batch; brown bread is brown because it is made from dark flours and colored with molasses; that is, pure, legal, honest breads take their color from the color of their natural ingredients.

But we hear of bread made today which looks like something which it is not; bread colored in imitation of the genuine article just as ice cream is colored yellow to make it look richer, distilled vinegar colored to make it look like cider vinegar, oleomargarine colored to counterfeit butter. It is just as illegal to add burnt sugar or caramel color to a rye bread mix to darken it, or to brown bread to give it a rich molasses color, as it is to turn white vinegar into cider vinegar with color imitators or oleomargarine into butter with annatto.

Any bread which owes its dark color to anything but the use of natural ingredients such as rye flour, graham flour, brown sugar or molasses, is illegal unless it is plainly labeled to show that it is

falsely colored. And any baker who foolishly uses coloring agents instead of good, sound, nutritious flours or sweetening materials in making dark breads, is liable to find himself before the judge vainly hunting for an excuse that will hold water.

## *The Ideal Loaf*

**E**VER since the baker began to relieve the housewife of the back-breaking drudgery of making bread, he has had to adopt one after another of Mother's intuitions.

The baker has found that Mother was right in her idea that yeast-made bread is best. He has shaped his baker's loaf to her home-baked loaf in texture, size, and shape. He has found that it paid in money as well as satisfaction to bake bread in a shop as sanitary as the ideal kitchen well could be.

Yet when it came to writing down the plans and specifications of an ideal loaf the baker found words quite inadequate.

Local prejudices had to be satisfied and local preferences had to be catered to. Yet the American Institute of Baking has seized upon the common points of excellence and has incorporated them into a standard score card. It can become authoritative only as it is used. We commend it to all bakers for study and adoption.



### *Wholesome Baking Materials*

(Continued from page 35)

The following regulations concerning registration are reprinted from bulletin No. 4 for the readers of *Baking Technology*:

Manufacturers desiring the registration of their products, will make application to the American Institute of Baking and such application shall be accompanied by:

- a. A sample of the product.
- b. An analysis of the product or a statement of the standards or limits of composition by which its character is determined.
- c. A set of circulars, descriptive information and other material or data in which the claims of the product are set forth.

Manufacturers' claims will be substantiated by analytical and baking tests.

After a product has been found to justify the claims made for it and to meet the standards and the requirements of the Federal Food and Drugs Act it will be registered by the American Institute of Baking.

If registration is denied because of false or exaggerated claims, or for other sufficient reasons, a second application for registration may be made after a period of six months during which time all conditions, because of which the application was denied, shall have been removed.

A monthly list of the products registered will be sent to all members of the American Bakers Association.

No fee shall be charged for registration. A nominal charge which will cover the actual cost of preparing and mailing the certificate will be made.

In the case of a disagreement as to the registration of a product between the manufacturer and the American Institute of Baking, the evidence shall be reviewed by a board of referees consisting of three members, one to be appointed by the President of the American Association of the Baking Industry, one by the President of the Council of Baking and Affiliated Organizations, and one other to be chosen jointly by the aforesaid Presidents.

A product which has been registered by the American Institute of Baking may be advertised and sold under its registration number for a period of one year. If at the expiration of one year the product continues to meet the conditions of quality and claims which obtained at the time of the original issue, the registration shall be renewed. If, however, during the period of registration the product is so changed in character that it does not meet the registration requirements, or the claims for its usefulness are proven false or misleading, the certificate of registration shall be cancelled and notice of cancellation shall be given to the members of the American Bakers Association.

It will be the purpose of the Institute to issue a certificate of registration with no greater delay than that incident to the analysis of the product in question and an investigation of the merits of the manufacturer's claims. In the event that a considerable number of samples of similar character are submitted, the certificates will be issued in the order in which the requests for registration are received.

The sample of the product should be sufficiently large to furnish material for several experimental baking tests. Since the registration will be made upon the basis of the quality of the sample submitted, it is obvious that the sample should be representative of the average run of the product. While slight variations in quality are to be expected in the course of manufacturing operations, the average character of the goods marketed must not fall below the standard upon which the certificate of registration was issued.

It is obvious that no products will be considered which do not meet every requirement of the Federal Food and Drugs Act both as to the character of the raw material used in its preparation, the methods employed in its manufacture, the use of artificial colors and preservatives, and other conditions which are not in strict accord with the law.

The registration certificate in which is engrossed the name of the article and its manufacturer and the serial number under which it is registered, will be issued by the American Institute of Baking. The certificate becomes the property of the owner of the brand and remains so as long as the goods manufactured and sold under the brand comply with the rules governing registration. In the event that the product sold under the registered brand is so changed in character that it fails to

comply with the rules for registration, or its advertising claims are proven false or misleading, the American Institute of Baking will require that the registration certificate be returned. The registration certificate is copyrighted. A certificate which does not bear the seal of the Institute and the signature of the Director is not genuine.

### *Seal with Registration Number*

In the event manufacturers of bakery products may wish to indicate in their advertisements, or on labels, that the goods in question have been registered, they will be permitted to use the seal of the Institute and the serial number under conditions set up by a contract entered into between the American Institute of Baking and the owner of the brand.

The analytical methods applied in this work have been largely those of the American Association of Official Agricultural Chemists, Washington, 1920.

The list of registered malt products and shortening agents is not claimed to be an exhaustive one. Many reliable products are missing from the list. Why? Omissions may be due to failure to comply with Institute standards or to lack of cooperation by the manufacturer in making application or sending samples.

Future issues of Baking Technology will carry further extensions of this list. Manufacturers who are not included and who believe their products demand favorable recognition should apply to the Institute without delay. It was announced in Bulletin No. 6 that the Institute is now ready to take up the examination of milk products. This work is now in progress and producers of this class of materials have submitted applications and samples so that a fair start has been made on these products.

The Institute wishes to make a comprehensive survey of milk products sold for use in baking and requests the co-operation of all manufacturers of this material whose application for registration have not yet been received.

C. B. M.

### *Editors Are Human*

A woman, who sometimes contributes to an Indianapolis paper, sent that newspaper a story entitled "Baking Hygiene." With no scientific education the good lady proceeded to revile bread and baked products.

She asserted many things against bread, including the alleged fact that it was not digestible and formed in soggy masses in the stomach.

This was quite some assertion against a product that has held its own as "the staff of life" since history dawned. It would have been easy to grow angry with the editor. Instead, a painstaking letter, brimming over with plain facts about bread, was sent to him.

And it brought this immediate response:

You are perfectly correct in your strictures on the bread article. It was not my intention to print it but it slipped in by mistake. Please give it no further concern. There will be no more like it. It was written by an old lady in the country without any malicious purpose but with the dolt's capacity for making mischief.

There is no industry so intimately concerned with the health and welfare of the public as the baking industry. Discontent and revolutions even breed on bad digestion. Editors know how to mix words as the good baker knows how to mix dough. But the bread mixer must give the editor facts to go on. He should never hesitate to seek an editorial contact and to expect a welcome, such as is extended in this case, when he comes with the proper facts.



# The Ideal Loaf

*and How to Score It\**

## PART II

**H**OW to bake the ideal loaf of bread has been a matter to challenge the spirit and resourcefulness of the baker ever since bake-shop pride began to influence baking practice.

Bakers Association, they will still further focus their efforts on certain standard considerations.

A full explanation of the score card follows:

<i>Score Card</i>	
<i>of The American Institute of Baking</i>	
EXTERNAL APPEARANCE	INTERNAL APPEARANCE
Volume ..... 10	Grain ..... 10
Color of crust..... 8	Color of crumb..... 10
Symmetry of form.....3	Flavor (aroma) ..... 15
Evenness of bake.....3	Taste ..... 20
Character of crust.....3	Texture ..... 15
Break and shred.....3	
	70
30	

The American Institute of Baking worked for two years to bring into written form some code that would define an ideal loaf. In the previous number part of the story of defining this code was told. The rest of the story follows here.

It is printed with full consciousness that the ideal loaf is the loaf which best pleases the largest number of customers. There is no other hard and fast definition for it.

In the country as a whole certain elements have been found to be appraised uncommonly high by bread consumers. Bakers have striven to attain these common attributes of quality. If they adopt and utilize the score card of the American

### *Appearance of Loaf*

Bread must be attractive in appearance. No other factor so influences the purchaser as the attractiveness of a well built loaf of good volume and golden brown color.

A smooth top loaf should have an even break on sides and ends, be well shredded and with no indication of a loosened or shell top; a split top loaf should be well split, not blind, with the cut surfaces well shredded and uniform. The split top loaf should show no break at the sides. The corners of the loaf should be well defined, slightly rounded, and there should be no break as they approach the top. The crust should be even, smooth and uniform in color.

\* Compilation of data collected by the American Institute of Baking.

## Eventually, Why Not Now?

Thousands of news clippings telling the interesting but impossible story of the return of the five-cent loaf have reached us. Our replies to these stories have been given a lot of space by editors and yet, with all our efforts to counteract bad publicity, we have reached only an occasional reader with the facts behind cut-price loaves and bargain-counter sales.

We can never catch up with Dame Rumor. She is a speedy and most evasive trouble maker. But she can be quieted—with your help.

THAT IS WHY WE ARE RUNNING THESE NEWS SERVICE SHEETS FOR YOU AND THE EDITOR OF YOUR OWN PAPER. Eventually, he will get the facts about cheap bread.

WHY CANNOT YOU TAKE THEM TO HIM NOW?



# A News Service for Your Paper

## AN EDITOR SEES FOLLY OF CLAIM OF 5-CENT LOAF

**Hartford City News Prints Bakers' Side of Price Story As an Editorial Leader**

Hartford City, Ind., Feb. ....—Almost unique among the editors of America who saw big circulation-getting possibilities in raising a hue and cry for 5-cent loaves, regardless of the effect on the bakers, is the Hartford City News.

It has not only printed the side of the bakers, who were being forced into the red side of the ledger by the hue and cry of the press, but has printed the facts about bread costs as a leading editorial. What it has to say about the 5-cent loaf follows:

The appearance of the five-cent loaf of bread in some of the big cities, when in fact a five-cent loaf cannot be retailed at a profit by the bakers, has brought an explanation from H. E. Barnard, former food inspector of Indiana, now director of the American Institute of Baking.

In one case the five-cent loaf was introduced by a chain-store which had so many other things to sell that it is immaterial whether any profit is made on bread or not, and it is even immaterial whether the bread pays its own way. As a business getter, sensationally low-priced bread may pay for itself in such a store in a host of indirect ways.

One case like that was investigated by bakers who knew their cost of ingredients was greater than the retail price of a certain baker's bread. They found he would sell only one loaf to a customer and then had good profit from the sale of pies, cakes and other such delicacies that he had in very alluring display.

Continuing, Mr. Barnard says: "The age of machinery is just coming into the baking industry. It is moving out of the cellar into the sunlight. Volume and quantity production spell more of a revolution in the industry than has occurred in all the previous years since Adam. For instance one oven in a big modern bakery can turn out in a week the normal bakings of over 200,000 women in their homes. And every loaf receives ideal treatment as to oven heat, moisture conditions and mixing.

"In this great modern industry, compared to the bakery where the baker's wife was his chief helper and the bakery was more often in a cellar than elsewhere, many conditions of cost and overhead figure, that did not formerly have to be counted.

"Coal, which is still high, and transportation which as not deflated, add heavy burdens that the public as well as the baker must visualize to be fair. More than this, the building up of the organizations in the baking industry calls for health supervision and conditions of work which the old bakery never could offer or approach."

## BREAD IS SEEN AS STAFF OF LIFE IN PEACE OR WAR

**Cornell Professor Proposes "Eat More Bread" As Slogan of the Hour**

Ithaca, N. Y., Feb. ....—People of the United States do not eat enough bread. A scientific authority of Cornell Medical College attributes the small quantity of bread consumed here to the fact that high wages are paid and that people are inclined to purchase the most expensive foods.

Not until the big world conflict was well launched did the present generation realize the significance of bread and the vast part it plays in the well-being of the individual.

A shortage of transportation facilities and chaotic trade conditions generally during the war resulted in distressing food conditions that brought home to the individual a keener realization of the true value of bread.

One writer in contemplating its tremendous economic importance exclaimed: "Today nations are made or wrecked because of their wheat supply or lack of it."

The lack of sufficient bread is a big factor in the conditions of unrest which exists in many parts of the earth today. The significance that is attached to an abundant bread supply is illustrated by the fact that in order to avoid the dangers of bread riots, several European nations subsidized the wheat loaf and charged the loss up to the cost of the war.

The French have always been big bread eaters. They get 60 per cent of their diet in the form of bread. The people of Spain and Italy are also hearty consumers of bread. Under the stress of war, the Italians derived 90 per cent of their nourishment from bread.

Great Britain also greatly increased her consumption of bread during wartimes. A very restricted meat supply meant that the British simply had to eat more bread.

In England bread-eating increased from 35 per cent to 50 per cent of the diet. The continuance of this large consumption since the close of the war is pretty good evidence that the English prefer this simpler diet to the more expensive diet of pre-war days.

Food experts now recognize bread as the master builder of physical strength. Bread is the best fuel food and the least expensive. It is also excellent repair food and the diet which includes a generous proportion of bread will renew the body tissues as they become worn through activity of many kinds.

## SENTIMENT ONLY NOW INDORSES MOTHER'S BREAD

**So Says H. E. Barnard of Bakers' Institute, in Praising Bakery Loaves**

Chicago, Feb. ....—H. E. Barnard, director of the American Institute of Baking, which is just opening a school for bakers here, issued this statement today, giving a baker's estimate of bakers' bread versus the home-made loaf:

"Home made bread is a matter of sentiment rather than of sound business management. Even after the housewife has paid the retail grocer his profit for handling the loaf he delivers at her door well wrapped, fresh and palatable; after she has compensated the baker for the expense to which he has been put to bring it from the factory to the grocery; after she has allowed him to take his profit she still gets her loaf cheaper than she can bake it herself.

"Any good baker can demonstrate this fact with paper and pencil to his complete satisfaction.

"But how many bakers have ever showed these figures to the woman who bakes bread in her home? How many have pointed out the fuel cost necessary to bread baking, the cost of the raw material, the yeast, the sugar, the shortening, which after much labor and no little worry are at length compounded and baked into the loaf?

"What baker has pointed out the saving which he can make to the bread user by buying all his materials at wholesale? The baker buys in quantity. The housewife buys by the pound. The baker's oven turns out thousands of loaves a day and the fuel cost of each loaf is insignificant.

"The gas or coal range in the home never takes more than two or three loaves, and the heat used in the baking costs far more than the housewife thinks.

"The baker works with wonderful machines which mix the dough batch and knead it into perfect condition with inexpensive effort. The cook uses brute strength in handling her material. The baker's loaf comes to the table free from worry. The home made loaf is the result of all the effort expended in getting the materials together, of the worry of setting the sponge and kneading the dough, in watching the oven and the experience of occasional failure."



# See That It Is Delivered [Lift from the Staples—Tear along double line, and send to your Local Editor]

## IF COAL STAYS UP BREAD MUST ALSO IS BAKERS' CLAIM

**New Bedford Man Gives Reasons  
He Can't Go Back to  
Pre-War Prices**

New Bedford, Mass., Feb. ....—High rents, excessive cost of coal, gas and light were declared by A. S. Martin, president of the New Bedford Master Bakers Association, to be the biggest items of expense to the baker that makes a further reduction in bread and other bakery products impossible.

Mr. Martin said the refusal of owners to reduce rents in proportion with the decline in foodstuffs, clothing and furnishings is threatening to exterminate the small business man. He declared that action should be taken to insure the business man a rent that will prevent any such disastrous effects as this would bring.

The statement of Mr. Martin's followed an inquiry of the New Bedford bakers would follow the lead taken in other cities where bread prices have been reduced to as low as five cents a loaf. This cut in prices, Mr. Martin said, is being carried on only by chain stores. The chain stores, he said, have to be considered entirely separate from the general baking business, since they are engaged in a price-war on bread in order to attract trade for their general grocery business.

"Rents must come down. Power, coal and light must come down. These are the principle items of overhead in the bakery business and they are large ones. We have reduced prices by a substantial margin. But that reduction has come from labor, our own profits and the drop in supply costs. Those things are now at the minimum and we cannot look for further relief there. But coal has not dropped ten per cent. The decline in gas and electricity has not been much more than ten per cent.

"Then when it comes to rents, there has not been the least drop. Just why the owners of property should be allowed to maintain war-time prices while nearly everything else has gone down is something that demands an investigation."

When told that large concerns are selling bread in New York state for five cents a pound, Mr. Martin averred that they are losing money and that they are only doing it temporarily for advertising purposes. Mr. Martin said he has just returned from New York, and finds that the same concern is selling sugar for four and a half cents a pound for the same reason.

## CHEMISTS SAY BREAD AND MILK IS BEST DIET

**Research into Vitamin Content of  
Both Foods Shows Grandmother  
Was Wise in Choosing Them**

New York, Feb. ....—There are many reasons why grandmother was right in making bread and milk the basis of the farm meal besides the reason that a bowl of bread and milk cost less than some other foods, declares Dr. H. E. Barnard, director of the American Baking Institute.

Dr. Barnard has been watching closely the spread of bread-and-milk week campaigns, since he is interested in the bread element of that combination.

"I was sorry to see," he declared today, "that many mayors and burgeses in Pennsylvania had the right instinct when they asked the people to return to bread and milk as a basis of the diet, and yet felt it necessary to stress cost alone as a controlling argument.

"We now know that grandmother was a pure scientist when she offered the milk pitcher, the loaf of bread and the butter pad to her hungry sons and grandsons. This is one reassurance that the students of vitamins have been able to give us.

"They have found that vitamins do not exist in animal food, primarily, but are something that animals may extract and collect from vegetable foods.

"Thus yeast and milk became the chief centers of supply for certain essential vitamins.

"Now the cow obtains the vitamins from alfalfa, which is rich in them, from bran and shorts, which are very rich in them, and from grass and other green leafy foods which are unfailing sources of these precious food qualities.

"And the cow assembles the vitamins in her milk. Nature provides that they go there for use of the young animals dependent on mothers' milk.

"One of the essential vitamins known as Fat Soluble A comes out of the milk with its butter. Thus when flour refiners mill away some of the shorts and bran of wheat, the bread-eater gets them right back again in the butter which by common consent has become known as the ideal spread for bread. In the meantime the cow has eaten them and collected their vitamins for the human body.

"When the bowl of milk is added still another fine element in making an ideally balanced food comes in. Mineral salts are essential to good digestion. Milk is richly supplied with them, and skim milk is as rich in them as unskimmed milk.

"Bakers are using milk more and more largely in their bread so that the quality of balance is coming more and more into the loaves of bakers' bread and to this extent removing

## BREAD IS OUR CHEAPEST FOOD

**Real Value Based on What It Gives,  
Not on What It Costs**

A scientist of nationwide reputation states that in our national diet cereals (bread) could well supply 50 per cent and dairy products 20 per cent of the individual diet.

Real value is based on what any commodity gives, not on what it costs in dollars and cents.

Bread, judged by this standard, would be at almost any price our cheapest food.

Bread has been called "the token of civilization." And the rapid strides in progress which the western world has made over the Orient is by many students attributed to the fact that bread is a more complete food than rice.

Wheat is the cereal par excellence in the baking of bread of the type which the entire modern world seems to crave.

Half the world is dependent upon the United States for wheat to supply this highly nutritious food.

Such vast agricultural resources make this country a great humanitarian power in supplying the sustenance that makes human beings in all parts of the world more efficient.

But while we are supplying other nations with wheat for their bread, we are neglecting a golden opportunity to make the most of bread in our own diet.

One noted authority says that if the consumption of bread in the United States was increased even up to 35 per cent of the diet people would generally be better off as to health, and the cost of living would be perceptibly lessened.

We can well afford to learn a food lesson from the many European countries whose populations secure fully 60 per cent of their diet in the form of bread.

the vital need for fluid milk in feeding of children.

"I have known of children who ceased to grow on a diet from which bread and milk had been practically eliminated in favor of meats. After many doctors had failed to cure one such child, a bread-and-milk diet, supplemented with vitamin-bearing fruits, restored it to normal weight and growth."

New York is the latest state to take up the idea of a return to an old-fashioned bread-and-milk diet. Pennsylvania's bread-and-milk week brought out a flood of reminiscences of farm life in which Old Timers told of the milk pan with its rich top layer of cream into which the bread was broken in the old days. Research chemists who are specializing in diet controls insist that bread-and-milk is coming back to every community, to certify to grandmother's wisdom and the wisdom of following along in her footsteps today.



# A Blank for You to Sign

*It Will Enable You to Play a Large Role in Making Your Magazine  
More Effective*

**B**AKING TECHNOLOGY is fairly on its way. With the first issue it gained the approval of the Baking Industry, for which it is published. Gordon Smith writes: "The new magazine, Baking Technology, is splendid. It is the best thing ever done for the baker."

But the baker is not the only one who needs the reports from the Research Laboratories of the Institute or the results from the Service Laboratory.

The chemist in the flour mill must know what the baking chemist is taught at the School and how he works in his control laboratory.

The methods he employs and the stand-

ards he sets are equally helpful to baking and milling chemists. Sellers of flour must use the same methods of judging quality as the buyers. The men of the Allied Trades who visit the baker are as interested in his shop troubles as he is.

Every baker who is not receiving Baking Technology because he is not a member of the Association will read it if he is interested in the progress of science into the shop. He will want to know of the fights the Association is making for his industry. He will wish to help. And so the blank below has been prepared for him and for everyone who needs the monthly service of Baking Technology.

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Cut out and mail today with your check. Delay may mean that you will be unable to secure the first number.

## Subscriber's Application

Baking Technology,  
The American Institute of Baking,  
1135 Fullerton Ave.,  
Chicago, Ill.

I wish to subscribe to Baking Technology and enclose my check for Five Dollars, in payment of my subscription for 1922.

Name.....

Address.....

.....

The glaze resulting from dextrinization of the crust by treatment with steam should leave the crust crisp, yet pliable, without toughness. Glaze should not be considered essential except where the customer fancies it.

A well baked loaf of suitable materials will be uniformly colored. Sides, ends and bottom should not show a pale or dead color but should be golden brown.

The shape of the loaf is influenced more by habit and custom than by definite knowledge of the best shape advisable for the several types of bread.

The ideal loaf should be properly proportioned as to length, height and breadth. Too short a loaf gives an apparently greater volume, but at the sacrifice of economy in use. A slice of medium size which is uniform in shape, rather than a heavily domed type in which the bottom is appreciably smaller than the mushroomed top, is better adapted for use at the table and in making toast.

### *Crust*

The color and characteristics of the crust are important factors in the appearance of the loaf and have been referred to in that connection.

A good crust is even surfaced, reasonably free from humps or wrinkles, but it may be slightly checked as result of contraction during cooling. It should be tender and the top crust should be of uniform thickness.

Its color is the most important characteristic, since it is an indication of proper materials and methods and correct treatment in the oven.

While the demands of the different parts of the country vary somewhat, the ideal crust color is best described as a golden brown. This term is varied by different observers who describe the ideal color as golden brown, bright, healthy, rich brown,

etc. The use of malt syrup darkens the color of the crust; cane sugar, on the contrary, gives a lighter colored crust. Formulas too low in sugar and sugar producing substances (enzymes, diastase, etc.) produce a loaf with a pale or straw colored crust. Overfermented doughs usually give a pale or straw-colored crust, due to the exhaustion of the sugars by the yeast during the prolonged fermentation.

### *Volume*

Loaf volume is dependent in part on flour strength and in part on the type of fermentation. Excessive volume is secured at the expense of grain and texture. The ideal loaf should have good but not excessive volume. A standard plain top loaf, weighing one pound, should have a volume of approximately 2,000 cc. The volume may vary somewhat, however, with the type of flour and formulas used. Loaf volume is also influenced by the size and shape of the pan.

### *Grain and Texture*

The terms grain, texture and pile lack definiteness of meaning and are often confused.

Grain is a condition of the crumb or interior of the loaf and defines the character of the cell structure and the size of the cell. The ideal grain is close and firm, with small, elongated, thin-walled cells. The cells are uniform in size, evenly distributed throughout the loaf and their greatest diameter is vertical rather than horizontal, and not larger than small bird shot.

The coarse grain, that is large, thick-walled cells, unevenly distributed, detracts from the appearance and quality of the loaf. Coarse-grained bread stales quickly and crumbles on cutting. A good grain results when the fermentation is properly controlled in the trough and the proof.



Doughs too young, too old or slack will produce bread of inferior grain.

### *Color of Crumb*

The color of the crumb is popularly supposed to show the character of the bread. With the evolution of modern milling processes and the consequent production of purified flour free from branny particles and specks of foreign material, its color has become purer and whiter.

While whiteness is desirable and denotes the use of high-grade flours, the tint of the ideal loaf is described as creamy white. The crumb should show no dark streaks or patches, but should be uniformly colored. For actual measurement of bread color an instrument known as the tintometer is sometimes employed. In bakery practise it is sufficient to compare the freshly cut loaf with loaves baked after the shop standard. The judgment of consumers as to the ideal color varies in different sections of the country. There is at present a reaction against the pure white color and in favor of creamy white or white blended with pale yellow.

### *Flavor or Aroma*

No term used in describing bread is more confusing than flavor. As here used it is the aroma as recognized by the organs of smell. Bread flavor is determined by bringing freshly cut surfaces close to the nostrils and expressing the gases included in the cells.

The flavor so observed will be noted by a skilled baker as sweet, rich, fresh, malty, musty, metallic, cheesy, or sour. The flavor of an ideal bread is best described as true wheat, sweet, nutty. Breads made with malt products have a characteristic malt-like odor. Breads in which milk is used in quantity have a desirable odor of richness and quality.

A strong or unpleasant odor is sometimes due to the shortening used. No bread ingredient should be used in sufficient quantity to impart a distinct flavor to the loaf except when this characteristic is desired to meet peculiar tastes or special demands.

### *The Test of Taste*

The most important attribute of good bread is a pleasing taste. The taste of bread is determined by the organs of taste as distinguished from the organs of smell. It may be influenced somewhat by characteristic flavors, but these must be disregarded in judging the taste. Unfortunately the same terms are used in defining taste and flavor.

The ideal taste is the same as the ideal flavor; namely, true wheat, sweet and nutty.

The character of materials used and the methods of fermentation determine the taste of the bread. "Off" or below standard ingredients impart characteristic unpleasant tastes. Improper fermentation develops tastes which mask otherwise normal and desirable tastes.

### *Loaf Texture*

Texture is determined by the sense of touch. It depends upon the physical condition of the crumb and to a minor degree is influenced by the grain. It is an expression of the elasticity, softness or pliability and smoothness or silkiness of the crumb.

The cut loaf should be so elastic that when pressed by the finger it resumes its original shape. The ideal texture is soft and velvety without weakness or doughiness. Like grain, texture is developed in the process of fermentation and depends both on the proper leavening methods and the use of high quality flour and shortening.

### *Barberry Bushes and Bread*

**B**ARBERRY bushes spread rust, the microscopic fungus that cuts down the annual wheat crop by millions of bushels. And so, since every lost bushel of wheat means less flour and bread, every one is concerned over the efforts now being made in Minnesota, North Dakota and other important wheat growing states to clean out the barberry bushes which harbor the wheat enemy.

It is interesting for bread eaters to know that at the same time the farmers of the northwest are fighting rust, they ask Congress for a high tariff on Canadian flour. The proposed tariff of 50 cents a hundred pounds of flour will keep more bread from the American table than can be saved by digging up a few pestiferous barberry bushes.

S. F. McDonald, a leading baker of Memphis, Tenn., and a member of the Executive Committee of the National Bakers Association, says, "The agricultural bloc which is hoping to build a tariff wall against the importation of Canadian wheat and flour on the theory that the wheat farmers need protection, is a far greater enemy of the American laboring man who wants cheap bread for his children, than the barberry bushes along Dakota fence rows." The baking industry knows that the wheat grower must make a profit, and is doing what it can to encourage the production of more and better wheat per acre. At the same time it looks to the vast areas of Northwestern Canada, as yet untouched by the plow, to furnish the wheat supply which our increasing population must have when our own wheat fields are growing corn, hogs and dairy products.

And for that reason the baker does not want his flour supply cut off by restrictive tariffs.

### *Baking Research Papers*

**T**HE research studies conducted in the laboratories of the American Institute of Baking by F. A. Collatz and L. A. Rumsey, graduate students of the University of Minnesota will shortly be submitted to the faculty for approval.

Their studies on some of the enzyme problems of flour strength will be of fundamental interest to the baking industry. It will be recalled that the American Institute of Baking and the University of Minnesota have an arrangement which is a striking example of the modern co-operation between the university and industrial research.

The liberal attitude of the university in permitting its graduate students to conduct research work in the laboratories of the Institute in partial fulfillment of requirements for an advanced degree will be notable in the history of the industrial influence of the American university.

Deserved recognition is due Dean Guy Stanton Ford of the Graduate School, Dr. R. W. Thatcher, formerly Director of the Department of Agriculture, Dr. Ross A. Gortner, Chief of the Division of Biochemistry and Dr. Clyde H. Bailey, Professor of Agricultural Biochemistry for making this co-operation between the Institute and the University possible.

Mr. Collatz has attacked the problem of flour strength as influenced by the addition of diastatic and proteolytic enzymes, while Mr. Rumsey has worked on the diastatic content and activity of wheat flours.

Both investigations are thus closely interrelated in their general aspects. The publication of this work will be not only a contribution to the literature of flour strength, but of interest in its application to certain problems of the bread making process.



### *A Baker's Feelings on Newspaper Assaults*

HOW many foolish persons who look down on the "butcher, the baker, and candlestick maker" as an unspiritual trio who know nothing about "high brow stuff," ever dream of the pride that a good baker feels in his loaves?

And of the spirit of devotion in which he sees them take the best form and shape he can desire for them? Men who feel pride in their own service, whether for the pulpit, the bar, or the editorial room, have not felt towards the baker as if he were one with them.

Yet one such baker, who found himself hounded on all sides by the press, when it was engaged in a "drive" against bakers, regardless of the facts, spoke out of his heart, certain items concerning how it all made him feel.

And here is what he had to say:

"These unjust attacks, and the reaching for general conclusions out of isolated instances put a damper upon the effort of the most intelligent in the baking industry to improve the character of their product and the service rendered the consumer.

"Why," asks the conscientious baker of himself, 'should I endeavor to improve the character of my product? Why should I endeavor to improve the sanitary conditions under which I bake bread, when there arises up in response only this condition of harsh attack and criticism which puts the legitimate baker in the attitude of a pirate?'

"The story of our best food article from its status as wheat in the field to bread on the table is a wonderful story.

"To do his part, the baker must engage in the most highly specialized effort of any industry. He must call to his aid the deepest secrets of applied science. We

have endured through this developing period, but what is the use when the dampening influence of harsh assault and criticism are being continually brought to bear upon us. It makes me feel like forgetting standards, baking chaff for the lowest possible price, and letting it go at that. The editors make me feel like this is all the people care for."

---

### *The Role of Yeast*

BREAD, raised with yeast, is our most important food. We get more material with which to keep the body warm, to repair wasted tissue, and to do our daily work from the few slices of bread and butter we eat each day, than from any other food. Indeed, we can go further and say that our bread supplies us with more nutriment and at less cost than all our other foods. We used to think this was due to the fact that bread and butter is a pure food, wholly free from waste, a rich source of carbohydrates and protein and butterfat.

Now we know that our daily bread has another vitally valuable food essential, the Vitamin "B," which is so necessary to healthful life. We know very little about the vitamins as yet, but we do know they are just as necessary as the heat-producing foods or the muscle or bone builders.

One of the richest of all substances in its Vitamin "B" content is yeast, the plain, ordinary yeast which is used in such enormous quantities by the baker. Perhaps the reason why bread and butter is such a splendid food and why, more than any other article of diet, it finds its way to the table three times a day—year on year—is due to the unconscious demand our bodies make for the Vitamin "B" carried into it by the yeast plant.

## A Baker Who Sees—And Acts

**B**ECAUSE BAKING TECHNOLOGY can only be worth while as it becomes the common voice of the whole baking industry it is heartening to receive letters such as this:

Bozeman, Mont., Jan. 17th, 1922.

American Bakers Association,  
Chicago, Illinois.

Gentlemen:

Your kind letter, with copy in regards the Midget Mill, has just arrived and I sure was surprised that you could have found time to tend to this so soon, now that you are just moving into your new quarters.

Well, Dr. Barnard, it is sure worth something to be associated with you. A baker in trouble will always get honest advice. I have found that out more than once.

Enclosed please find check for \$31.00: \$21.00 in payment for dues and \$10.00 for the accounting system.

I have received your booklet about the readjustment of dues and will certainly do my share to help this very worthy enterprise along. You have missed one thing in your reorganization plan, namely, to provide for an organizer. I am sure our income could be greatly increased if all the bakers would join as there is no reason why a few hundred of American bakers should carry on the work for all.

There are bakers right here in the State of Montana doing good business, who are well off and benefit by the work of the Association but do not belong—not because they don't want to

but because they have never been asked or pressed. Have you on your membership list all the following bakers?

Tice's Electric Bakery.....	Bozeman, Montana
The Ideal Bakery.....	Livingston, Montana
Donaldson's Bakery.....	Three Forks, Montana
The Electric Bakery.....	Laurel, Montana
The N. W. Distributing Co.....	Billings, Montana
Arnold's Bakery.....	Miles City, Montana
Gourly's Bakery.....	Havre, Montana
Joe Bauer's Bakery.....	Great Falls, Montana
Van Dyke's Bakery.....	Harlowton, Montana
Red Lodge Baking Co.....	Red Lodge, Montana
Nicol's Bakery.....	Billings, Montana
The California Bakery.....	Butte, Montana
The French Bakery.....	Butte, Montana
The Barker Bakery.....	Helena, Montana
The Royal Bakery.....	Missoula, Montana
Plains Bakery.....	Plains, Montana

These are not all the bakers who can afford to belong to the Association. Our state is very large and I do not just remember all the names. I travel all summer and visit most towns within two hundred miles of Bozeman and will do my best to have all the bakers I meet join the Association. Here are a few more: The Hardin Bakery, Hardin, Montana; The Forsyth Bakery, Forsyth, Montana.

Yours very truly,

THE BON TON BAKERY.

(Signed) Graf.

It is a pleasant duty to inform Mr. Graf that, after inspecting our records, we find that five of the bakers in whom he has taken an interest are members of the American Bakers Association and are making full use of its facilities.

## The Bread and Cracker Industries

*Their New Place in the World*

### BREAD BAKERIES

Number of establishments...	24,919
Persons engaged in manufactures .....	159,283
Proprietors and firm members .....	27,779
Salaried employees .....	24,253
Wage earners (average number) .....	107,251
Primary horsepower .....	136,677
Capital .....	\$417,017,457
Services .....	168,885,548
Salaries .....	168,885,548
Wages .....	132,171,264
Materials .....	610,105,001
Value of products.....	954,875,753
Value added by manufactures	337,750,752

### CRACKER BAKERIES

Number of establishments...	176
Persons engaged in manufactures .....	41,187
Proprietors and firm members .....	54
Salaried employees .....	6,792
Wage earners (average number) .....	34,341
Primary horsepower .....	29,273
Capital .....	\$112,230,722
Services .....	38,171,117
Salaries .....	12,035,149
Wages .....	26,065,795
Materials .....	103,134,410
Value of products.....	202,895,010
Value added by manufactures	100,886,155

Figures furnished by U. S. Census Bureau.



# White Paper Is Cheaper, But—

*Have You Seen Any One-cent Newspapers Crying  
for the Five-cent Loaf?*

NINE-TENTHS of the great newspapers of America are fair, just as nine-tenths of the great leaders in every industry are fair. But some isolated editors, in their lust for sensational drives for public notice, have made war on the bakers in ways that transgress all rules of fair play and decent editorial practice.

One such newspaper, published in a Pennsylvania city, speared the members of the baking industry in his city with question after question about costs of white flour and sugar NOW as compared to pre-war days and war days. It demanded in effect that bread should follow white flour down as it followed white flour up.

Now it so happens there is another industry in our land and it depends on white print paper instead of white flour.

During the war white paper went away up in price, and newspapers followed white paper upwards.

Yet white paper has come AWAY DOWN in price and newspapers are still printed at the war-time level for single copies, and still print advertisements at the war-time level of advertising rates.

Is this fair for a stone-casting member of a usually honorable and decent fraternity?

It occurred to us that a fair exchange of information between editors was no robbery. So on behalf of an industry which has found it cannot follow white flour up and down while labor, rents, transportation and repairs are still to be paid for on war-time levels, we asked the editor of this rampantly coercive newspaper a few questions.

We asked what the composing room costs in his plant were in 1922 compared to 1916.

We asked what the cost of new linotype machines were in 1922 compared to 1916.

And what the paper was charging for advertising in 1922 compared to 1916, and what it was charging the subscriber in each of these same two periods.

Then finally we asked what the newspaper was paying now for white paper compared to the peak of war-time prices, and whether or not it could safely go back to pre-war advertising and subscription prices at this time.

There was nothing abusive in our letter. We only proposed that the editor give us something to print about his industry in OUR paper while he was printing noisy slanders on our industry in HIS paper.

And what do you think his reply was? It was that the CASE WAS CLOSED. He had ridden down the industry and had flushed up a few timid souls who were willing to bake bread below the cost of production of a loaf of standard quality. He concluded this was victory enough.

And then concerning white paper and the editorial sanctum, he wrote us this paragraph:

"The Times has not been accused by its advertisers or its readers of profiteering when it sells at two cents a copy (twice its pre-war price), and your comparison of its advertising rates with bread prices holds only to a certain degree. Advertisers would not pay the price for space if they did not believe they were getting value. Bread, on the other hand, is a necessity of life, and a thing that people must have. If the price

can be kited by combinations to an exorbitant figure, the people must buy their bread at that figure."

Now, that's quite a considerable bit of a confession, isn't it, from an editor who might be pardoned for thinking his words were the most important thing in the world?

It is all right for him to cover his advancing costs—because his product is comparatively unimportant, but for the baker—oh, my!

Now, it just happens that in another city out in the Middle West, a newspaper owned by a famous United States senator started a bread war all of its own.

It was going to give the people pre-war prices on their bread, and it never stopped to learn the lesson of white paper and the present inflated price of other elements of

newspaper costs. It found a little baker who agreed to sell the 5-cent loaf.

It made a hero of this baker, and started to drive trade towards him with much free advertising. Then the baker decided to take some display space.

He tried to pay post-war advertising bills on pre-war bread prices.

You can guess the rest. The baker failed and had some bills he could not pay. AMONG THE BILLS WAS ONE FOR \$100, for advertising. And this bill was due to the very newspaper which had wolfed the industry up without any intel-

ligent comprehension of its ledger conditions.

The Chamber of Commerce committee in the city where this paper was published received this bill, and its history. It wrote the editor of the victorious paper a little letter, reminding him that these are days of high overheads and many manufacturing difficulties and that a little

sympathetic understanding would be an excellent oil for the newspaper office's typewriters.

Only a request that we are inclined to think is ill-considered, prevents us from naming the city and the state where this tragedy of recent bread wars occurred and also from printing a reproduction of the newspaper's unpaid bill for advertising.

Now, why can't every editor find out what every baker knows? This is that the baking industry

is constantly chastened by conditions such as no other industry faces.

These conditions include the fact that Mother has remained the poorest paid and best loved laborer in the world. It has ceased to seem economical to do any of the work that Father formerly did around the home. The tall apartment rears its head, on the economic basis of the furnace fire in the cellar, tended by one janitor, as against twenty fires in twenty homes, tended by twenty different husbands and fathers.

The baker at every turn of the road

### *A Bread War Poster*

*Circulated Anonymously in Detroit*

#### BAKERS:

Don't sell bread at cost and less. The man or firm who sells bread at 5 cents for 16 ounces at present price of flour, either steals his flour, beats the parties he buys flour of or ends up in the bankruptcy court.

**DON'T LET THESE PRICE  
CRANKS AROUND TOWN  
RUN YOUR BUSINESS.**

Make the best bread, use the best flour and **SELL AT A PROFIT.** Fight for your rights. Tell these cranks you will run your own business.



has had to bring some mother along with him in his progress. That mother counts in the backaches of bread baking even if the newspaper editors scorn them, is clear from the fact that bakers in many of the cities most heavily under newspaper assault REPORT THAT THE WOMEN PAID PRACTICALLY NO ATTENTION TO THE ASSAULTS.

In Detroit newspapers went to the extreme of proving that bread could be baked at 5 cents a loaf in the county poorhouse and, therefore, ought to be no more than 5 cents a loaf in the city anywhere. The papers drove pell-mell at the bakers and urged all women to go back to home baking.

Considering the work that the modern woman has found to do for herself, the fool man who orders her back to the dough pan might as well try to order her back to hoop skirts, poke bonnets and the spinning wheel.

Editors can rest assured of one sure fact. Machines are going to rescue Mother from the kitchen as surely as they rescued Father from the harvest field, the wood pile, the water well and the grindstone.

It was too bad that in Detroit bakers said, furtively and anonymously in circulars, what they should have proclaimed openly from the housetops as the creed of their industry.

Here, for instance, is one of those anonymous circulars that welled out of the overfilled heart of some honest baker, who felt himself fighting against overwhelming odds when he encountered the metropolitan press:

*"Bakers:*

*"Don't get frightened by the windy articles you read in the papers—by the Women's Clubs—the Cash and Carry Stores and the politicians. They want you to do business without any profit.*

*"The average baker pays today \$7.50 for his Patent flour—he can't make saleable bread out of soft wheat flours—he must have hard wheat flours (Minnesota or Kansas Patents). You cannot expect to compete with the House of Correction (when the City and County pays all overhead expenses)—besides this, who wants bread on their table made by convicts?"*

*"A baker who sells bread at wholesale, at the rate of 5c for a 16-ounce loaf is a fool or else heading for the Bankruptcy Court. Furthermore, no Flour Mill or dealer will give a baker any credit who sells at this price.*

Now, what editor can take exception to that circular as the sound truth about any industry, including the industry that bases itself on white paper instead of white flour?

We wish the editors of America—the portion that feel they ought to fling darts into the baking industry—could have been present at a meeting of the Chicago Women's City Club at which bread prices were discussed.

Bakers were allowed to tell of the great and unusual overhead costs, including huge raises in taxes, that they now face. The women arose and gave their own costs for their own home-baked loaves. And they put their costs per loaf for ingredients alone at 4½ cents.

"And this," said one, "is without counting anything for my time and my kitchen overhead, the value of utensils or the fuel consumed in baking. Taking everything into account, I think that baking bread is about the cheapest and poorest use I can make of my time of any I can think of. I propose to let the baker bake my bread and use my time otherwise to better advantage."

And that's the meaning of the fact that attempts of the newspaper editors to scare women back to the dough pan have failed. The baker is Mother's best friend today. No editor need think he can come between them.

# California Acts on Bloc

*Its Bakers Join Rest of America in Seeking  
Fair Tariffs on Baking Materials*

THE agricultural bloc in Congress is not going to have the joy-ride over the residents of eastern consuming centers that its leaders planned for it some time back.

The bloc members have heard many messages from home since they first planned prohibitive tariffs that would make low-priced bakers' cakes a thing of the past. And these messages have not been very comforting to those who thought they had no eastern public opinion to reckon with.

The bloc members have not only heard from home, but curiously enough the home folks, even in California, have seen the point that coercive monopoly control is not wanted in America, even when the control is in the hands of the politically powerful California co-operators.

These co-operators furnish America as a whole one of the most useful object lessons of present day organization in marketing. In the case of oranges they have actually kept prices down and quality up. The California orange growers sent out lecturers to hundreds of trade associations and their business in every case was to drum up good will.

The raisin growers, unfortunately, did not follow the spirit of the orange growers. They coaxed bakers, by bakery demonstrations, to use raisins in their products. Bakers obliged by putting out raisin bread in bulk and doing their best to create a market for it.

For thanks their raisin bills were jumped faster than almost any other bills they had to pay during the past year.

Middle-of-the-season price jumps even were attempted, it was charged.

Fresno folks, who found that the raisin crop was transforming that southern California city into a gay metropolis, forgot all about good will, apparently, and the morale that good will can build up between the seller and the buyer of a product.

It was found that suddenly all California political power in Congress had been consolidated to force through tariff measures which would practically stop the importation of several important bakers' materials. In the case of filberts, on which a prohibitive tariff was asked, California had none whatever to offer and could only hope by driving the filbert trade out of existence to force it over onto almonds and walnuts.

As it happened California had never grown almonds and walnuts for bakers. It had sold its whole crop for table use.

In the case of almonds, it was even found that California was not acutely interested because of PRESENT almond grove interests but because of a land boom in lands that might be fit for growing almonds. She wanted America tariff-taxed in favor of her Future Hopes.

Eastern bakers knew the age-old lesson that high price makes for slow sales and that in the case of bakers' cake there was a definite limit above which consumers would not go. They would not even try to eat cake when it was priced above that certain definite limit.

In this situation, while state associations of bakers were sending appeals to Congress, the question came up of what



the California bakers were going to do about it.

Would they see the problem as bakers or as Native Sons of the Golden West?

Anyone who will glance at the telegram to Senator Hiram Johnson, printed with this article, will obtain for himself the full answer.

Bakers will have to learn a lot about California, and it is only fair in return that California should learn something of our bakers and how they feel towards California methods and California products.

Here, for instance, is the view of California brought forward by John M. Hartley, of the Retail Bakers' Association, in a paper prepared for the same Senatorial committee that our bakers of the east and west have appealed to:

"The baker is ever conscious of California. With many of our essential products California has achieved a monopoly, and she aims at a monopoly with regard to the rest.

"The Nation can ill afford to turn over, through tariff taxes, the demands of the whole country to one state, to be exploited as a monopoly.

"California has pressed her claims persistently and successfully until she has become little more than an organized appetite for 'more.'

"She is the most organized and best press-agented area on earth. She 'points

with pride' or 'views with alarm' on every occasion, or on no occasion at all.

"She is even inter-organized as well as organized. Stand up against a raisin man who is gouging you and immediately a Petaluma egg man is your sworn enemy.

"Offend a nut grower and the chances are you will have to settle with a Chamber of Commerce or a railroad company.

"Question a lemon grower and every organized civic and industrial body in the Golden State will arise to crush the rank outsider.

"California can organize more noise on any subject that touches her interest than any other ten states combined.

"California's tumults and her shoutings never cease. She knows it pays to advertise. Her wailings keep her sister states all keyed up and ner-

vous. Then when she brags about what she can do she keeps them bluffed.

"She cultivates the art of taking. Her business in life is to collect. Her initial cost to the Union may not have been great, but the upkeep is enormous and it is still growing."

In Chicago, Fair Price Commissioner Russell J. Poole, and in New York, Markets Commissioner Edwin J. O'Malley are both giving intensive study to California methods and California's tariff demands. Both are planning campaigns of education to arouse our eastern cities.

### *A Telegram on the Bloc* *Showing How California Bakers* *Help the Public*

Los Angeles, Cal.,  
Feb. 6, 1922.

Senator Hiram Johnson,  
Washington, D. C.

Master bakers of So. California oppose duty of 5 cents per pound on unshelled almonds and 15 cents on shelled almonds. Feel that as we raise but 9 cent of almonds used duty would only cause higher prices on bakery products. Request that you for good of the consumer refrain from placing duty hereon. If impossible to prevent duty fifty per cent reduction should be made. Respectfully request your aid.

WM. FRANCIS IRELAND  
Sec. So. Cal. Bakers Associations.

# What Even the Children Know

*Noted Scientist Finds Nature Led Them Aright to Bread  
and Milk for Vitamines*

WHY do children love bread and butter, bread and milk, bread spread thick with molasses or jam? They do not choose bread because they know it is rich in food essentials. They are not often concerned over the fact that it is the cheapest food in the pantry.

They call for it between meals, they devour it at the table because they like it. They just want it. And in the light of our new knowledge of nutrition we are beginning to see what a wise old dame Mother Nature is. She sees to it that children, given half a chance, will themselves select the most essential foods.

On this subject Dr. Walter H. Eddy of Columbia University in his new book,

"The Vitamine Manual," writes: "In a school in New York City I recently had occasion to discuss the school lunch room and its offerings with the children of the school in the light of vitamine discoveries. The keenness and intelligence shown by the children in the discussion that followed has convinced me that in this matter of vitamines the children themselves can be relied upon to assist materially in the matter of better food combination and intelligent selection."

And every mother who sees her brood of lusty youngsters devouring bread and butter will bear witness to Dr. Eddy's statement. If the truth were told she probably knew it before he did.

## Bread—and Bread!

TOO many people seem to think that bread is just bread and should be sold for a common price. No one knows better the fallacy of this statement than the housewife who has had experience with different quality of flours.

She knows that she can not produce good bread from poor materials and she also knows that good materials cost more than poor. She also knows that to employ good help costs more than poor help. Knowing all these things, therefore, why should she not expect to pay more for good bread than poor bread? She does, but the average baker does not have the nerve to put his own price on his own product. He competes in price with all the cheap bread in his market.

If the prevailing price is based upon the cost of cheap bread, the baker of quality

goods is denied the opportunity of giving to the public the best he knows how to make, because of his high material cost, and the public is thereby the loser.

The time will come when progressive bakers will be able to and will produce a product so good that the public will demand their goods and will be willing to pay an additional price over the poorer article. And when this time does come the leading bakers of the community will be the quality bakers. It has been said that a man who can produce a better article than anyone else, even though it be a mouse-trap, will have a beaten path to his door, even if he lives in a wilderness.

HERBERT L. SOMERS,

President, Superior Baking Co.  
Fort Wayne, Ind.



## Books for the Baking Laboratory

THE CHEMISTRY OF ENZYME ACTIONS. By K. George Falk. 140 pp. New York, 1920. Chemical Catalog Co., Inc. Price \$2.50.

**D**R. FALK'S book on enzymes is the first of the American Chemical Society Monograph Series to be published. Primarily, it is of interest to specialists and research workers, and from this standpoint is a useful contribution to the literature of enzymes. It is not, however, a book for the general reader who may lack the background of biophysics and chemistry.

The applications of enzymes of importance to the industrial chemist are briefly mentioned. The fermentation industries, the production of glycerol, acetone, succinic acid, acetic acid and other organic compounds receive some attention. Baking, however, is rather neglected. This may be due in part to the fact that investigators have not as yet interested themselves to any great extent in baking problems. On the other side there is not much evidence that the advances in enzyme knowledge and technique have received much application in the bakery.

The study of enzyme action is fundamental not only to the solution of many dough room problems, but to the use of materials containing enzymes, such as malt and other products. The bread-making value of a flour may be largely influenced by its enzyme content and activity. This is one of the aspects of the "flour strength" problem.

"Flour strength" appears to depend upon a number of factors. Well known are flours with an inferior or weak gluten which do not give a dough of high gas-retaining capacity. The dough does not rise like that of a strong flour and a poor

loaf of bread results. This condition is apparently related to the amount and physical properties of the gluten.

On the other hand there are some flours in which failure of the dough to rise is due in part to the lack of sufficient available carbohydrate for gas production by the yeast. After the dough has risen once, the sugars are exhausted with negative enzymic activity for the production of additional carbohydrate. This condition is an enzyme problem. Flours vary widely in enzyme content and activity under different climatic and other agronomic conditions, milling, storage and treatment in the dough room.

Subsequent editions of Dr. Falk's book will probably include information of special interest to the baker as the attention of research workers is directed more and more to such industrial problems. On the theoretical side the first edition presents much valuable material that cannot be found elsewhere in any one book.

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MARGARINE. By William Clayton. XI + 187 pp. 12 half-tone plates and 12 figures in the text. Longmans, Green & Co., London, New York, etc. 1920. Price \$4.75.

**T**HIS is one of the excellent Monographs on Industrial Chemistry edited by Sir Edward Thorpe. According to the author it "is the first of its kind in any language" that gives an account of modern processes for the manufacture of margarine. Chapters are devoted to the oils and fats used in the manufacture of margarine, edible hydrogenated oils, examination of milk, manufacturing processes, theory of emulsification, analytical methods, deterioration of butter and margarine in storage, lard compound, and

nutrition, with special reference to the vitamin question. A bibliography is appended which gives the reader an unusually good list of the important references on these subjects. The chemist engaged in the baking laboratory will find this book valuable in the examination and study of shortening agents.

EDIBLE OILS AND FATS. By C. Ainsworth Mitchell. XI+159 pp. Six half-tone plates and four figures. Longmans, Green & Co., London, New York, etc. 1918. Price \$2.50.

THIS is another useful book in the same series, for the investigation of shortening agents. It presents in concise and condensed form the essentials of the chemical composition, properties and analysis of the important oils and fats.

In addition to these two useful monographs, the following general works on fats and oils are suggested for reference:

Allen's Commercial Organic Analysis. Vol. II and IX, 4th Edition, Philadelphia, P. Blakiston's Son & Co.

J. Lewkowitsch. Chemical Technology and Analysis of Oils, Fats and Waxes. 5th Edition, 3 Vols. London, 1915. Macmillan.

L. Ubbelohde. Handbuch der Chemie und Technologie der Oele und Fette. 4 Vols. Leipzig, 1908 et seq. Hirzel.

F. Ulzer and J. Klimont. Chemie der Fette. Berlin, 1906.

C. R. Alder Wright and C. A. Mitchell. Animal and Vegetable Fixed Oils, Fats, Butters and Waxes. Their Preparation and Properties, London 1903. Griffin.

Hydrogenation of Oils. By Carleton F. Ellis, 2d Edition, New York, 1919. Van Nostrand.

COCOA AND CHOCOLATE, THEIR CHEMISTRY AND MANUFACTURE. By R. Whympers. XXI+568, 2nd Edition. Philadelphia, 1921. P. Blackiston's Son & Co.

THIS new edition of Whympers's work on cocoa and chocolate is in some respects an improvement on the first. New chapters have been added on the nutritive side and the description of the various types of beans now on the market has been revised.

The analytical aspects of cocoa and chocolate have not been neglected. The American predilection for chocolate not

only in confectionery, but in pastries as well, makes this book of decided interest to the sweet goods baker and confectioner.

TECHNICAL METHODS OF ANALYSES. METHODS EMPLOYED IN THE LABORATORIES OF ARTHUR D. LITTLE, INC. Edited by Roger Castle Griffin. XV+666 pp. New York, 1921. McGraw-Hill Book Co.

A collection of analytical methods of distinct usefulness to the chemist engaged in general control work. C. B. M.

### One Woman's View

Washington, Feb. 3, 1922.

THE BUYER has been made skeptical by the so-called psychology of salesmanship. The safer method is to base sales on superior quality.

"It seems to me your plans for expanding, elevating, and safeguarding the baking industry are fundamentally sound and should appeal to all discriminating home-makers.

"It is gratifying to see an organization like yours realize that it should render service to the public. We have gone a long way when we ask the home-maker to buy a product whose superior quality is self imposed.

"If you can maintain the high standard which you have set for the Association, and can make membership a reward for maintenance of high class bakeries, I feel confident that you can educate the housewife to demand the superior product."

ANNA E. RICHARDSON,

Chief Home Economics Service, Federal Board for Vocational Education.

### An Aspiration of a Baker

Omaha, Feb. 6, 1922.

"I would like to see the day when Baking Technology is read by every progressive baker in the country. I wish to congratulate you on the new journal, which is very interesting.

"J. J. MARKEY,

"Wholesale and Retail Baker."

We count on men like Mr. Markey, who see the need, to carry forward our cause to every corner of the land.



# Laboratories Ready for Service

*American Institute of Baking Examines in New Home Wide Variety of Baking Materials and Technical Supplies*

THE American Institute of Baking has greatly extended its research and technical service for the baking and allied industries since its removal to the new location in Chicago.

In addition to the equipment formerly used in Minneapolis it has now consolidated the laboratories and other scientific facilities of the Wahl-Henius Institute with its own. This improvement in resources makes it possible to announce that the Institute is now ready to examine the widest variety of baking materials, products and miscellaneous technical supplies in its new analytical and bacteriological laboratories.

Analytical and other control work, special investigations and consultations can now be carried on under more favorable conditions than was possible under the old arrangements at Minneapolis.

The new experimental baking, flour or cereal laboratory will be of unusual interest to the baker, not only in special details of equipment such as ovens, fermentation and proofing cabinets, but in its exceptional resources for the complete examination of flour and other cereal products and foods.

The examination of flour is one of the most important services that the Institute can give the baker. A thorough knowledge of the flours that are purchased for the bakery can only be attained by constant laboratory supervision. This not only applies to the grade and baking value of the flour and how it should be handled to make good bread, but to its relative freedom of infection from organisms, molds and bacteria. The attention of both the baker and the miller is called to the

facilities which the Institute now possesses for the examination of flour.

It has been suggested that the Institute can be of efficient help to both industries in cases of disagreement on analytical results such as moisture, protein, ash, gluten, etc.

How many bakers realize that they can use the Institute for the analytical control not only of baking materials and products but for such miscellaneous raw material as coal, coke, oils, gasoline, soaps, washing compounds, trough and divider grease, boiler compounds, sweeping compounds, paraffin paper and other material of a technical nature?

If the baker submits such products to the Institute laboratories he will soon learn the value of this work as measured in dollars and cents. It is only by the strictest supervision of raw materials, processes and products that uniformity can be attained and uncertainty eliminated from the shop.

Not only can the laboratories be of service to the baker in the examination of such materials, but it can also test and standardize the thermometers, hygrometers and pyrometers of the dough room and oven.

Many bakers who are troubled by dough room problems will find that the difficulty lies in the use of a thermometer of inaccurate readings.

The Institute was founded by practical bakers for research and education in baking. No matter how ample its scientific facilities and organization may be, it will fall short of the purpose of its founders if its resources are not used by every baker who is in need of technical help.

3.7.00 Ag. Sem.  
BAT

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association*

Vol. I

CHICAGO, ILLINOIS, MARCH 15th, 1922

No. 3

## The Price of Learning How

THIS is the story of two bakers in a certain small town and a buyer of bread who came between them.

The buyer of bread saw that there was some feeling between the bakers and he thought he could exploit this feeling.

He received one day a bill from one of the bakers for bread. It was merely a driver's memorandum and mentioned the number of loaves without the price, as the bill he was to pay was due later from the bakery's general office.

But the buyer of bread saw how he could use this memorandum. He showed

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it to the other baker and told him it meant he was receiving a secret rebate below the public and announced price for bread.

The second baker became incensed—at his associate in the baking trade but not at the bread buyer. He decided that a war was on and this being war he would adopt war measures.

"I will charge you the usual price," said the baker victim of this bit of intrigue. "But I will

give you one loaf free for every five loaves you purchase."

That was the beginning of the war. And then the fun began. And the fighting.



The two bakers became foes for life. Or at least for a year. They engaged in a price war that knew no limits, and in a war of mutual villification that knew no restraints.

One of the bakers had his plant outside the city limits. The baker with a plant inside the city limits went to the Commercial Club and asked its members to pass resolutions denouncing the "outside invader." He asked the Mayor to protect him as a taxpayer.

And then, in the course of time, the baker who was inside the city limits saw that he was facing bankruptcy, unless he developed new trade to carry the losses he was making inside his own town. He invaded another village far to the northward, where he had no competition. And there he put up the price to a profitable basis.

"Say," said the first baker who had been under fire from the Commercial Club, "how is it a crime for me to sell in your town when it is all right for you to go to the next town and sell. Your town makes automobiles that are sold all over America. Now I am going to show you up. I am going to invade this new town you have started to sell in and I will meet you there on equal terms, and cut the price to the bone as you started to do on me before this war was opened up."

And so it went on.

Finally both of these bakers were asked to join the American Bakers Association.

Each one reluctantly replied that a year earlier he had had enough money on hand to do it but now he could not as a price war had cleaned both of them out. And they had lost in a year of warring all they had made in the prosperous years preceding.

Then they found there was an Indus-

trial Relations section of the American Bakers Association. Would both agree to meet and find out what each thought of the other under friendly auspices?

They did. They began to recriminate. From abuse of each other they turned to charges of double dealing with the grocer who first pried them apart, in the matter of understanding each other.

Each one told his story as to that grocer. The one who had been told the other was making rebates produced the unpriced delivery slips. He found what they really were—not evidence of secret rebating at all, but only a drivers' memorandum which the clever bread buyer had utilized for his purpose of starting a price war. Then both of the bakers compared their accounts of profit and losses. They found they had been egged on into a war that had brought both to the verge of ruin. And yet had no other basis of fact to go on than that they had no way of speaking to each other under a common understanding of what was fair and right.

"And weren't we a pair of chumps" was their chorused greeting to each other as they shook hands and decided that the way to sell bread was to sell it on its merits, at a fair price, which will not be changed by secret rebates.

The big new home of the American Bakers Association has housed some meetings which show the stress and woe through which men who have long been accustomed each to go it alone regardless of the general welfare of the industry, have milled through to mutual understandings of the way to marshal their industry for common service.

Our work is under way. The new day that co-operation spells for the baking industry may not yet lie beneath the full glow of the morning sun. But at least it has dawned.

# Our Association—Is It Justified?

*A Letter of Inquiry From a Doubtful San Francisco Baker and a Reply  
From Our Office*

**S**HALL the bakers of America work together to solve such problems as tariff attacks, oversized express rates, underbaked state regulations differing widely in every state, and the thousand and one problems that afflict all alike?

And shall these same bakers work together, through a central organization, to carry forward the baker's cause, make the public acquainted with the magnitude and importance of the seventh American industry in point of size?

Or in an age of co-operation, shall each baker "go it alone," ignoring the rule of life with the wheat growers, who have their Farmers' National Council, the orange growers, who have their California Orange Growers' Association, the eggmen, whose Petaluma Co-operative was able to swing the Agricultural Bloc to make radical recommendations for advance in egg tariffs?

An inquiring baker has asked the American Association what it has to offer. His inquiry is, no doubt, similar to that in the minds of thousands of bakers who have hesitated about the course best to pursue towards their association.

The answer to the questions asked by this baker no doubt answer all similarly minded bakers. Therefore, the following two letters are submitted to the members of the baking industry as a whole.

The inquiry:

PEOPLES BAKING COMPANY  
17th and Bryant St.  
San Francisco, Calif.

February 20, 1922.

American Bakers Association,  
1135 Fullerton Ave., Chicago, Ill.

Gentlemen:

I am in receipt of your letter of January 16th, together with statement for dues up to June 30th, 1922, showing a balance due of \$126.00.

Before asking you several questions following, I will explain by saying that I have but recently assumed the management of this firm and consequently am not as familiar with the benefits and workings of the American Bakers Association as I might be. I am making this statement so that you will appreciate the questions asked are intended to enable me to know just how the Association will be of benefit to this firm and this firm of benefit to the Association.

Naturally, the first question that comes to mind is: What material benefits can a firm such as ours expect from our membership in the American Bakers Association?

In order to know just how strong the Association is, I would like to know what percentage of machine shops existing throughout the country now belong to your Association and what percentage do you think will belong to it under your new organization?

I would also like to know in what way, if any, the By-Laws require members to maintain any ethical standard of competition and if they do, what is the penalty should a member not respect that standard?

You can gather from these questions that I am curious to know whether or not the Association expects to be able to maintain a majority of the bakers throughout the country in their Association and if they do, if it will be able to cause the individual members to maintain a standard in competition and operation that will have a general tendency toward the improvement of conditions in our industry.

Please understand that I am not, in any way, finding fault with the American Bakers Association, but naturally, if our dues are to amount to \$312.00 per year, the first question that comes to mind is: What do I get for this money? Naturally, no business man would care to pay this amount simply to be able to say that his firm is a member of the national association.

Please accept these questions in the spirit in which they are given and, on receipt of your answer to this letter, I shall probably be able to come to an intelligent decision as to whether or



not we will make a good member of your Association and whether your Association will be able to benefit us.

Yours very truly,

PEOPLES BAKING COMPANY.

By Frank Enos, General Manager.

The answer:

To this letter Dr. H. E. Barnard replied on behalf of the American Bakers Association, as follows:

February 27, 1922.

My Dear Mr. Enos:

In your recent letter you very properly ask "What material benefits can our firm derive through its membership in the American Bakers Association?" This is an inquiry the Association must expect from every prospective member and our reply must be so conclusive that no baker who reads it will have any doubt as to the value of his membership. This is our answer:

1. Membership means participation in the scientific work on which the baking industry rests. The American Institute of Baking is a department of the Association. In its research laboratories the problems of the baker which have remained unrevealed, are being studied that we may know the secrets of the materials used in bread making and so produce a more nutritious, better loaf. The baking industry is a scientific industry just as truly as the steel, glass and dye industries. It will never take its rank as a most important industry in its service to humanity until it knows better than heretofore what it is doing.

2. Membership means the support of the School of Baking in which the boys of today are trained for the work of the future. The American Association has established its school in order that it may populate the industry with men who have trained minds as well as strong arms.

3. Membership means participation in the work of the service laboratories. The baker cannot buy his materials, flour, milk, shortenings, sugars, intelligently unless he knows what he wants, orders by specification, and by analysis determines that his purchases meet his requirements. The service laboratories are establishing specifications, formulating adequate analytical methods, furnishing the baker who has no laboratory with the advice and assistance he must have if he is to keep pace in his industry.

4. Membership means an opportunity to help put Baking Technology, the journal of the indus-

try, on the reading tables of laboratories and libraries. The scientific story of bread must be told before it will ever be understood. The boys who are studying chemistry in the schools and colleges will never enter the baking industry until they realize that the baking of bread is a scientific industry and until they know that the baker is a scientific manufacturer and that the baking industry offers a wide field for service and high rewards for success.

5. Membership means support of every activity of the Association and participation in the rewards which must follow such work. Every act of the Committee on Public Relations which speaks for the baker before Legislatures and before Congress in its work for honest bread laws, for fair tariffs, for reasonable sanitary regulations, is service to the industry in which every baker must share. The Committee on Trade and Industrial Relations, in its work of adjusting trade controversies, in settling industrial disputes, in formulating sound, economic policies, in bringing employer and employee together, is benefiting not only the community at large but every baker in every shop.

6. Membership means participation in the work of educating the consumer to appreciate the value of bread. Bread making cannot be swept out of the home until the housewife believes in manufactured bread, until she realizes that it is better bread than she can bake herself, until she knows that it is cheaper bread than she can produce with her own hands. She can never be taught these truths until teachers of Home Economics, until editors, until dietitians know the facts behind the loaf, until they know how nutritious it is, how cheap it is, how well made it is, until bread taken from the baker's oven is no more a subject of criticism by fair price committees and by dietetic experts than any other need of modern life that was once manufactured in the home is now far better and far more cheaply made in the factory.

7. Membership means the industry united behind definite standards. The application blank signed by the baker who wishes to join the Association requires him to agree to conform to the sanitary code which sets out specific requirements for the location and construction of his plant. It lays down the methods which must be used in operating the bakery and it specifically relates the requirements as to health of employees. The applicant for membership pledges himself to conform to a code of ethics as a definite obligation. This pledge to the American

home, to the employe, to his fellow baker and to his Association, is a binding obligation which the member is in honor bound to keep. The penalty for non-maintenance of the standards of the American Bakers Association is suspension or cancellation of membership. This section carries with it forfeiture of the right to use the Association emblem. The power of suspension and cancellation is lodged in the Board of Governors. Section 7 of Article 10 of the Constitution provides that

"The Board of Governors shall receive all complaints of unfair competitive practices arising between members in any community and upon receipt of such complaint give immediate acknowledgment of same and shall have full power to employ any form of investigation into the merits of issues between members, to effect settlements where possible, to act as arbitrators after hearing testimony and to determine such action as the Association shall take with respect thereto."

The American Bakers Association includes in its membership the leaders in the industry, both large bakers and small bakers. It is not possible to give the percentage of membership. The number of bakers who belong to the Association is comparatively few. We have about 800 members.

There are 32,000 bakers in the country; about 2,000 shops are listed as wholesalers. Indeed, there are probably more than this number who do wholesale business. The members of this Association operate about 3,000 ovens. During the war the group of bakers who formed the American Bakers Association claimed to manufacture 80 per cent of the commercially baked bread. These rough figures give you but a crude idea of the strength of our membership.

It is our confident hope that as the work of the Association becomes more clearly understood, as the value of its laboratories is more thoroughly appreciated and as the students from its school scatter throughout the country, that ultimately every progressive baker will want to do his part in maintaining the banner held high by the Association.

It is quite beyond my power to set out for you all of the reasons why the Peoples Baking Co. should be an active member of the Association, but I am confident that if you can come to the convention which we shall hold here at our home next September you will not only be glad that

you are a member, but proud of your membership.

Yours very sincerely,

H. E. BARNARD,

Secretary and Business Manager.

In its pioneer stages each one of the big organizations under which the meat industry, the citrus fruit industry, the egg industry, and almost all other large industries marshaled themselves, was a small organization, sustained by devoted and far seeing pioneers. The question among bakers is how soon the vast, pre-occupied majority will come to see the unselfishness and disinterested service for all of those who bear the early burdens. Every new member means strength for all; indifference means postponement of the day of maximum association service.

### *As a Woman Sees It*

"I am very much interested in the method the American Bakers Association is using to set aside the good baker from the bad one, and I feel sure that every intelligent housewife will be delighted to have this help in choosing bread.

"I am glad also that you have made ethical business practice and fair play with the worker part of your plan. It seems to me you have a program that should win the support of every progressive man in the baking industry and every customer who uses bakers' bread."

ADA M. FIELD,

Associate Professor of Food Chemistry,  
George Peabody College for Teachers,  
Nashville, Tennessee.

Bakers have long been conscious that no one will look up to their industry and recognize it as one of the great industries of America until they themselves do it. The bakers having made a move in that direction it is pleasant to note that a woman keenly interested in food and food value, sees so clearly the lines along which progress must be, and is being, made.



# Baltimore's View of the Bloc

*C. B. Pitt Writes to Congressmen What He Thinks of Its Excessive  
Tariff Demands*

MEN of the eastern coast of America, as well as the western, have found it necessary to rush to Washington protests both by telegraph and letter against the joy-ride California raisin growers, lemon growers, egg men, walnut growers and almond growers proposed to take over the great consuming centers of our country.

The tariff demands of the Golden Staters have been tamed down a great deal since the bakers of America began to make it clear that these demands constituted a raid on the American pocket-book that would strike great eastern cities very hard, and would redound to the benefit of a monopoly market on the Pacific coast. The bakers have demonstrated that they would not be hurt so much as the great masses of the people from whom they would only be collectors of huge tariff-taxes for others' benefit.

As this issue of Baking Technology goes to press it appears possible that the new tariff bill may be delayed for some time. Politically many believe this is not a "tariff year."

But while this issue broils among the lawmakers many propagandists are at work trying to make the American public believe that something evil is to be thought up by the very words "eggs from China."

They have influenced state market commissioners to give out statements denouncing eggs from China as a menace to health in America.

Such statements from state officials would command more respect except for recent experience in other lines of products. At a time when America suffered

an acute potato famine, government officials stopped a train load of potatoes from Canada and claimed they were infected with some mysterious disease. They were plenty good enough for the northern wing of the good old Anglo-Saxon family, but not for that which lies south of the Mississippi's sources.

Similarly lamb from Australia, beef from the Argentine and oranges from Mexico have been assailed. All that bakers need explain to inquirers who fear that bad eggs may get into American cakes because they are imported eggs is that every single shipment of eggs is examined closely under the microscope by U. S. government chemists.

Chemists do not speak in prejudice or from local bias, or to make politics. Quality passes, regardless of point of origin. And every bit of egg that reaches American bakers from abroad passes inspection to which American eggs are in no way subjected.

If American consumers only knew the simple fact that the baker gets, in his imported egg products, the whole sound egg, broken and frozen, or dried, within a very few hours after the hen laid it, these consumers would not be fooled by any high-tariff propagandists.

Food consumers have an interest even more acute than the baker in the propaganda to run down foreign eggs. For the huge surplus of China thus comes to our American use, whereas in America there is no surplus, and the only eggs offered for the baking trade are those that need to be broken in the egg packing plants because of cracks or checks.

If bakers had to fight with table con-

sumers for the American egg supply prices would go skyrocketing and market manipulators would have a closer clinch-hold than ever on the consumer.

Mr. C. B. Pitt, of the International Company of Baltimore, wrote to every U. S. Senator a protest against the Agricultural Bloc's proposed tariff demands on eggs. As the protest is one that involves all residents of eastern consuming centers, some paragraphs from it are reproduced herewith:

"We protest against the proposed exorbitant rate of duty on dried egg," Mr. Pitt wrote, "because for one thing, candled eggs sold wholesale last October as high as 95 cents per dozen.

"At the same time dried eggs for bakers' use sold on a basis of 20 cents per dozen for fresh eggs in the shell. The dried eggs are for a highly specialized use and do not compete with American fresh eggs that go to table service.

"Imported eggs help the baker keep prices down during the period when American eggs are held in storage by speculators for speculative profits. A prohibitive tariff, therefore, would hardly benefit the egg producer in America at all, but would nearly ruin the cake business. Thus it would throw many people out of work and render vast investments in machinery useless.

"As practically no dried eggs are produced in the United States there is no home industry in this material to protect.

"In view of all the facts involved I hope you Congressmen will not allow the speculative egg dealers and the packing interests to create a false demand for eggs from the baker, with protection to the vendor in the form of a 400 per cent or 500 per cent increase in tariff on dried egg yolk and dried egg albumen."

As it is with the case of the egg tariff,

so it is with the walnut, the almond and the raisin tariffs. All would permit one section of our country to levy undue tribute on another section. The bakers of America naturally wish to avoid playing the role of go-between in any such a game. They want open markets and fair prices for all. Every baker, who bakes against the desire of housewives to turn to home baking if not well satisfied with what the baker offers, knows how acutely open is the market in which he does his work. He knows that California is much more likely to kill what trade there is than to create new trade by the Agricultural Bloc's tactics.

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### *Wild Yeast*

Bread should be baked by the college bred, says the head of the American Bakers Association in announcing the opening of a new school of baking. Does that mean when Freshman Billy writes dad that he needs the dough, he means he will use it, if remitted, for the dough he kneads?—Toledo News.

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Bread is coming down a bit in the bake-shops. Does this mean it will cease to be 15 cents a bite in the dining cars and on the tables of our best hotels?—N. Y. Morning Telegraph.

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Bakers everywhere arise to say they simply can't bake bread for a jit. This means the results of the war for Normalcy in this one industry will probably be nit. —Waterloo Courier.

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If bread wars continue in America the country may wake up again to the fact that there is such a thing as a 5-cent coin. —Lawrence, Ky., Journal.



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entry in the post-office at Chicago, Illinois, as second-class matter, applied for under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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MARCH 15, 1922.

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### *Our Growing Pains*

LET NO MAN despair because all do not see eye to eye in these troubled days for the baking industry. When men seek to work together in a pioneer way, they may find through many an adventure in the wrong path, just where the right path lies. Progress mills through, or muddles through, as the British say, until the great new organization at last finds itself. In a free joining together of men, to march in fellowship, one of the greatest privileges of those joining is the privilege of making decisions even when these decisions prove to be mistakes. But just as no cloth ever came from the weaver's so rough that a well tempered iron could not smooth it out, so will the rough edges of pioneer work in marshaling the baking industry be smoothed out. Destiny lies this way, and not in a pouting withdrawal from the ranks at each hard place ahead.

### *As to Bleached Flour*

TO BLEACH or not to bleach, that is the question. But the fret and worry is on the miller's head, not on the baker's. The miller must satisfy the food laws, state and federal, and indicate by appropriate markings his endeavors to improve the color of his flour or simulate the virtues of age.

The baker, thus far at least, has not been required to stick a label on his loaf to indicate to the consumer that the staff of life has been chemically whitened or synthetically aged.

Some years ago, when bleaching was rapidly becoming a standard practice as millers endeavored to meet the real or fancied demand of the housewife for whiter and whiter flour, a determined effort was made by food officials to check the installation of bleaching outfits. But aside from a few state laws no general opposition to the practice was raised and gradually bleaching was accepted as an improved milling process, quite legitimate if properly indicated to the purchaser by legible branding of the sack.

Within the past year, however, the question of the legality or ethics of bleaching has been raised again. Health authorities are asking why flour should be made to appear whiter than it really and naturally is and in more than one

state it is evident that the question of bleaching has not been dead, but sleeping, during the last fifteen years. Its liveliness now is of a degree to give him real concern as to the facts.

The baker is interested in bleached flour. He will leave to physiological chemists the determination of its harmfulness or harmlessness. And the conclusions of the food officials as to the ethics of bleaching will satisfy him. But he has to face on his own responsibility the question of the effect of bleaching on the quality of the flour he uses. There are so many methods of bleaching that he cannot assume the burden of determining which method is best. Nor can he run a chemical laboratory to find out how and to what extent his flour is bleached.

It is sufficient for him to know the facts. And so he is asking of his miller, "Is this flour I am buying bleached or not, and how?" That is a fair question. If flour is bleached it should be plainly labeled and the invoice should declare the fact as well as the sack.

If there is no reference to bleaching on the label or bill or contract the inference is that it is not bleached. And with that understanding the baker is willing to rest his case so long as no ban is imposed against his bread by legislation.

## *Behind a Paint Barrage*

IN PREPARING this, the third number of Baking Technology for the press, the work with pen and typewriter was done behind a paint barrage. In a strong odor of oils and pigments, and the sizzle of paint guns, the details of the remarkable conduct of the Mayor of Tiffin, O., in driving the baking industry as far as he could towards the wall, had to be noted and appraised.

And these paint guns—each one squirted paint as if possessed by demons from whom it was determined to get away, cuttle-fish fashion. A man who pulled the trigger on one of them declared that once when in a hurry he had covered 18,000 square feet of surface in an 8-hour day.

His usual day's work, he said, was to paint over 10,000 feet of surface in a day. It would take eight men with brush and paint pot to do as much, he explained. And from the guns, when making their barrage, there was no escaping for the dark corners. Where brush would miss its mark the new paint flowed in almost with a vengeance. It saturated like mustard gas.

An editorial room was cleared for painting in the morning and was painted and drying before the fall of night. Here, then, was change in the world, and yet how



many people in the baking industry cling to old customs and old ways, in the face of advances as great as the paint guns have brought to painting?

"Have I made a mistake?" writes one baker in a letter that must be read as the paint guns sizzle, "by buying a high speed mixer? It seems expensive. Will I get, if I join the American Bakers Association, anything compensative in return?"

The hissing guns seem to sizz out their own answer. They are covering the walls of the old Institute of Fermentology where for years master brewers were educated in their profession. Red walls served for that work; all that they stood for now has perished.

White walls—creamy white—presage the coming of the new era with its baking machines, and the opening of the school that will turn out Master Bakers, where Master Brewers once were made.

Cling to the old ways? Who can afford to in this changing world? Even the paint now being put on is different from the old—vastly changed in nature and so mixed that it can be washed down any day, with perhaps some cleansing device that will come along in the wake of the paint spreader to keep such a wall in prime condition.

And the work to be done in these newly whitened walls? Where has the world a task more fascinating?

## *Bread, the Gogetter*

ARE RETAILERS good merchandisers? A close watcher of recent bread wars, and the flaring up of bread as a trade leader at a price below the cost of production, remarked that once he worked in a department store which telephoned customers each day asking if they needed certain articles.

"On that list," he said, "the word 'BREAD' was printed. ALL THE OTHER ITEMS WERE CHANGED DAILY." He continued the story with explanations that alert salesmen had learned that when in the home most articles were short, the family got along, but that when bread was short the family inevitably sent to the corner store.

He then explained that there was no such "trade puller" as bread in all the trade horizon—save only milk. And he told how foolish the grocers were when they picked on the milk trade as if it had been a nuisance, and drove it to the distributors' wagons.

"With only bread left," he said, "they often abuse their privilege of handling this greatest of trade pullers until I can make more money on one dollar invested in a bread distributing system, to compete with retailers, than I can make by investing \$5 in bread production."

Here is something for the entire industry to think about. Orange growers, through a central marketing system, educated retailers until they dropped the margin of profit from 68 per cent to 27 per cent, and found they made more money in the frequency of turnover than they had formerly made from the too-widely stretched selling margin.

Bakers selling to retailers who charge 2 cents or more above wholesale on each loaf, and retailers insisting on this margin, please note.

### *Five-Cent Dynamite*

THE Northwestern Miller, one of the most intelligently edited magazines in America, has had alert writers on the watch for matters affecting the relationship of the baker to his public.

The editor of this magazine takes a view of bakers' problems as broad as life when he writes of "Five-Cent Dynamite."

If editors of newspapers in general only knew the baking trade as does the Editor of the Northwestern Miller they would know how important it is for the public to appraise the baking situation in the terms that this Editor here lays down. His is an editorial every baker could well afford to pass on to the nearest publisher in his own community.

We reproduce it herewith:

The recent sharp advance in wheat prices has given those bakers who were chiming in with the demand for a five-cent loaf exactly what they deserved. Since its low point early in January wheat has advanced about thirty-five cents a bushel, nearly half of the increase

having taken place within the past ten days. This means that wheat today costs the flour miller thirty per cent more than it did six weeks ago and, accordingly, the baker is paying thirty per cent more for his flour.

Bakers who have not advocated or accepted a standardized price for the loaf of bread will have no great difficulty in adjusting their selling prices to the new situation. Once the public is accustomed to a fluctuating bread price, it will unhesitatingly pay the extra cent demanded by such an increase in the cost of materials. If, on the other hand, the public has been encouraged to believe that five cents is the proper price for a one-pound loaf of bread, it is no easy matter to alter this belief, as was amply demonstrated in the early years of the war.

The question of whether or not bread can be profitably sold at five cents a pound is absolutely beside the point. A fixed and traditional bread price is bad, no matter where it is set, equally dangerous at five cents, or ten, or three. The five cent unit is the hardest of all to get rid of, because the nickel is a convenient coin, as the street railway companies know to their cost, and because it has years of custom behind it, but the principle is entirely unaffected by the specific price established.

Under the circumstances, any baker who advertises a five-cent loaf is hurting both himself and his competitors. If he feels it absolutely incumbent on him to do something startling, let him by all means advertise his bread at two loaves for eleven cents, or even nine cents, or let him specialize in pound and a half loaves, which he can sell at any price that suits his fancy.

He can then keep pace with the rising wheat market, and show his customers that he has all along been playing fair.



# Attorney-General Takes Action

*On Request of Herbert Hoover, Mr. Daugherty Tells Trade Associations Their Legal Status*

WITH the producers of everything the bakers of America use rushing into trade associations, some of which are marketing associations as well for such articles as raisins, eggs, wheat, pumpkins, it was high time the Attorney-General defined just what is within the law in co-operative effort.

Individualism, and the sharp fight for advantage over a neighbor, has given way all through the world, to cooperation and a marching together of men in each industry for its common weal.

Of those who saw that the Attorney-General should act to map the field of cooperative effort, Herbert Hoover was one of the most insistent. As Secretary of Commerce he moved to smooth the path of organized effort by obtaining a legal opinion in advance of any possible law violation.

The opinion as handed down by the Government's chief law officer, becomes a guide-star to all who may join the American Bakers Association. Needless to say it is a guiding compass to the Association's officers. We publish here both the premises set forth by Secretary Hoover and Attorney-General Daugherty's answer to him.

Mr. Hoover set forth that:

"No form of legislation has ever yet been devised, nor has man, with all of his genius for invention, ever been able to devise a rule of regulation that would prevent men from committing crimes if they are so minded. The best that can be done is to forbid the doing of certain acts or to command the doing of others, prescribing proper punishments in the case of the commission on the one hand and the omission on the other; and when legislation takes that form, rules and regulations and adminis-

trative constructions which have for their objective the making of the prohibited thing more difficult will always include within their terms the law-abiding citizen as well as the prospective criminal.

"Trade associations have been in existence for many years. The great majority are legitimate, both in form of organization and in activity. The minority, while lawfully organized under articles expressing lawful purposes, may engage in activities that are evidence of purpose contrary to and outside of the declared purposes in the articles of organization.

"It is with much earnestness that I claim there is propriety, generally speaking, in trade associations. Their lawful field of endeavor is large, and their activities work for promotion and advancement of the public welfare and for progressive economic organization."

Mr. Hoover submitted to the Attorney-General eleven questions covering these activities of trade associations. The points set up in the several questions were so fully covered by the Attorney-General in his reply that it is now possible to classify the illegal and permitted acts of trade associations. They are set forth in brief as follows:

## ILLEGAL ACTS

The acts of trade associations declared illegal are:

- Conspiracy to enhance prices.
- Conspiracy to curtail production.
- Conspiracy to suppress competition.

Arbitrary establishment of cost of production or of cost of any item entering into cost of production.

Adoption of uniform trademarks or labels to be used by natural competitors who are members of the same association which would tend to result in the same price being charged for all articles of the same class bearing identical labels.

The collection of credit information for the purpose of establishing blacklists.

### ACTS WITHIN THE LAW

The acts of trade associations declared permissible are:

1. Adoption of standard cost accounting systems.
2. Adoption of uniform trade phrases.
3. Adoption of standard grades, forms of contracts, machinery and processes.
4. Collection of credit information.
5. Placing of insurance for members.
6. Co-operative advertising and use of general trade promotion phrases, slogans, etc., such as "Made in Grand Rapids."
7. Promotion of employes' welfare, education, etc.
8. Co-operative management of legislative questions and litigation.
9. Co-operative action to promote closer relations with the Government.
10. Collection of statistics of production, costs, prices, consumption and distribution, and dissemination of reports to members and to the public.
11. Compilation from members' reports of prices received on closed transactions of consolidated statements giving average prices, these to be made public.

Attorney General Daugherty in a general reservation covering these activities, states that in the event any of the privileges are abused and employed in such a way as to curtail production, enhance prices or suppress competition, no immunity can be claimed and prosecution will follow as in the case of any law violation.

Members of the American Bakers Association will be glad to see that the activities of their Association are all listed as permitted acts.

### *Coming Along*

In her recent progress out of the kitchen the modern mother has had no friend equal to the modern baker. Father won his way out when the plumber learned how to put in water faucets, and the gas man relieved him of the need to carry coal. Now mother follows along when she solves all her bread worries by the simple request of the grocer: "A loaf of bakers' bread, please."

### *An Editor Who Can See*

MANY newspaper editors have focused their whole aspiration for Normalcy on the baker alone, and in their drive for cheaper bread have cast behind them good sense and reason as well as fairness to the industry which they assailed.

In a flood of newspaper articles pillorying the baker, comes one from the Gary Post, of Gary, Indiana, which shows that this newspaper has an editor of real intelligence and contact with the hard facts of this deflating, but not deflated period.

"Labor enters very heavily into the cost of almost every product we buy and the labor cost is responsible for the failure of many products to get back to normal.

"There is plenty of competition among bakers and there is no reason to believe bread could be held at a high price long after the cost of making it was reduced.

"Dr. Harry E. Barnard, well known in Indiana where he was state food commissioner for years, is now manager of the American Bakers Association, and the American Institute of Baking, and he has just made a very interesting statement about the bread situation.

"Dr. Barnard says flour alone is only 40 per cent of the cost of the baker's loaf. It has come down, but rents, coal, transportation, and labor cost the bakers as much as during the period of inflation.

"Dr. Barnard is a man of standing and probity and it is probable that he is speaking facts. To reduce the cost of bread to the public the labor cost must come down for next to flour it is the big cost in bread. Prices can only come down as the cost of making things comes down."

Bakers in every part of the country could well afford to clip out this article and hand it as an example to common sense applied to the baking industry, to any inquirer as to the baking facts.



# Hot Breads of the South

*Too Great a Dependence on Their Self-Rising Flour May Injure Health*

BY HELEN LOUISE JOHNSON\*

IT HAS been my task in the last few months to investigate certain conditions as they affect the ability of the home economics demonstrators to teach needed things. Among the club efforts, canning clubs, corn clubs and the like, they are endeavoring to start bread clubs in order to improve what is a habitual, standard food still of very poor quality in too many homes.

For natural and practical reasons into which I do not need to enter, the North in general eats yeast bread, and the South quick breads. Climate is the determining factor in this, that and habit. Out of every one hundred barrels of flour sold in several of the Southern states, some ninety are self-rising flour, a soft wheat flour, so deficient in gluten that it cannot be employed in the making of yeast bread even before the leavening is added.

To this has been added by known formula phosphate, soda and salt. The teacher of home economics might be able to cope with the situation better if this thing were classified as an attenuated baking powder or sold for what it really is. Flour is a misnomer, and self-rising flour an explanatory term.

We are not vastly distressed over individual use of this flour even if one chooses to eat pancakes or biscuit of it every morning of his life, although we would advise against it; but we are deeply con-

cerned over the use of the self-rising flour by those whose diet is restricted so largely to grits, corn meal, some fat meats and hot breads.

We want a cow to every little home, vegetables in the back yard, but meantime we want food control officials to help us secure such standards for this product as will maintain a proper grade. At present there seems to be no regulations controlling it, and while we prefer straight flour for our uses for every reason given, so long as this flour is sold and used, we must ask that it be made of such flours as to secure its being nutritious and not subject to the abuses common to its present use.

The usual practice of making hot breads is generally known. To begin with, the formula calls for an excess of acid to allow for the pinch of soda the manufacturers say the woman always adds. If it were only a pinch it would not be so bad. But investigation shows that the cook all too frequently mixes the flour with butter or sour milk, if she has milk to use at all, and adds soda to sweeten this, as she terms it.

Frequently the leavening strength of the flour has sufficiently diminished or even when it has not, the cook still adds some more baking powder or its equivalent. For those who drink milk and eat plenty of green vegetables and butter fats, the vitamins present in the flour are a matter of little moment. But when family after family use flour, and cereals, corn meal, hominy and the like as their staple foods, the nutritive elements left by any process of manufacture or household use are of vital concern.

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\*Editor's Note. Helen Louise Johnson is one of the best known students and teachers of Home Economics in the country. Her educational and editorial work places her in first rank of the nutrition experts. Bakers will read the following extract from her address before the Twenty-fifth Annual Convention of the American Food Officials with keen interest.

# What the Public Thinks About the Baker

The baker is making and winning his war with the public to convince it that it is receiving honestly priced bread, baked under conditions that match or exceed the cleanliness of the best of modern home kitchens.

Nobody wants to get "stung," on any price he pays.

Almost any man, who wants to keep the world going aright, will fight before he submits to extortion. Also he will listen to a case of any accused person before deciding against him.

Bread prices have been built up under the most intensive competition any industry has ever known. The home baker in the kitchen did not rank with "sweated" labor, for such labor was paid at least something.

While the woman in the home counted the cost of raw ingredients to her, and matched them against a baker's loaf of bread, she never counted wages for herself, or kitchen overhead and expense. Even so she abandoned home baking, in large part, as the baker slowly won his way with an ever improving product.

The average woman has an interest in the bake-shop now. Editors recognize this and will print news that appeals to them as of value to their readers.

**YOUR PART IS TO GET THE NEWS TO THEM, FOR THEM TO LOOK OVER.** And this news-insert gives you a means to act. **BE SURE THAT YOUR LOCAL EDITOR OBTAINS HIS COPY.**

It consists of articles other editors and reporters have written, and clarifies problems of the industry all must know about.

Being right isn't all of the story; convincing the public that you are right is important, too. Hence this labor done in your behalf.



# A News Service for Your Paper

## ASKS IF BRICK CONTROLS PRICE OF NEW HOUSES

**Baker Puts a Question in Telling of the Many Factors in Cost of Bread**

"I will give you a loaf of bread that drops in price every time flour drops a little when you will build me a house whose price you will drop with every drop in the price of brick."

In these terms Jacob H. Hershey of the Hershey Baking Co., at York, Penn., outlined to a contractor and builder the problem of the baker who is assailed on all sides with charges of profiteering.

Mr. Hershey went on to give the side of the bread baker who has a case in these days of bread wars and demands that bakers perform services which they loudly protest are impossible.

"The handful of chain stores and department stores that are selling bread below cost," said Mr. Hershey, "can afford to lose it because it is worth thousands of dollars to them to point with pride to their bread prices as 'evidence' that their prices on other goods are at rock bottom.

"All kinds of people buy bread and nine-tenths of them have no idea what the word 'profit' means. Some of them think—if they think at all—like a fourth grade school boy, that a price cut in half means half as much profit. Others—including 'high-class' politicians and statesmen—seem to think a profit is something to be ashamed of, and that there should be a law against making any profit. It is really astonishing how many strange ideas there are about business, among the people who never had any of their own.

"Of course, the popular thing among newspaper writers and civic investigators is to point to the price of the flour. The public and its self-appointed agents do not see the labor and the coal and the long list of incidental items that go into bread baking, costs of which are way above pre-war figures. Neither do they see that reduced prices of flour increase the home baking, cutting into the bakers' business, and diminishing his profits still further.

"There is no reason why any baker should do business at a loss, just because the customers would like to have him. The bakery business is a private enterprise, and the only real price regulator is competition. There is not going to be any five-cent competition to amount to anything for a long time to come."

## MODERN BAKER BRINGS RELIEF FROM DRUDGERY

**He Saves Women in the Home From Heavy Labor in Kitchen Through Machinery's Aid**

Not so long ago, the question of bakers' bread against home-baked bread was a question of whether a woman in the home should bake the family's loaf, or some bearded immigrant baker should bake it in a shop of doubtful sanitary condition, out of uncertain materials.

But now, says Dr. H. E. Barnard, director of the American Institute of Baking, all this has changed. The question now is the age-old one of man-power against modern machines.

To a Virginia editor, who urged that home-baked bread was best, Dr. Barnard put the case for the baker in these terms:

"I notice in the midst of a very fair and fine little article in your paper about bread prices, that you put in a word or two about home-baked bread versus bakers' bread.

"People patronize bakeries too freely; home-baked bread is the kind everybody likes best," you say.

"I wish I could tell you just how interesting a statement that is, when it is viewed in the light of new inventions which are finding their way into the baking industry. One of these inventions is a dough mixer which will mix in one batch as much dough as several thousand women could. And its steel arms have the strength of a million mothers in them. It takes the backache out of bread baking and releases mother from the oldest form of drudgery of which there is a record in our world. In other words, the baking industry is a big, modern industry. It is seventh in America in importance, and has come up from seventeenth through the past three or four years.

"Now did you think of mother's backache or just the finished bread when you beckoned her back to the kitchen? American women know that the modern baker is their best friend and has given them the same relief from drudgery that American men got when the reaping machine displaced the hand cradle, and when the water faucet in the kitchen displaced the Old Oaken Bucket and the wood pile where father knew how to wield the axe.

"There are many, I suppose, who really feel that never can water taste the same as it did when it came from the 'moss-covered bucket that hung in the well,' but who wants to be numbered among such folk?

"And if you really could see the inside of a modern bakery you would know that potentially it can take mother's ideal loaf at its very best and reproduce it a million times over. A chemist, who knows exactly at what temperature bread should be baked, and who knows exactly at what temperature the dough mix should be left to stand, presides over all operations.

"In every loaf the crust is just so,

## EVANSVILLE BAKER GIVES PROMISE OF CHEAPER LOAF

**But He Also Lists Other Things That Must Drop in Price First**

Bakers arose in almost all parts of the country, when interest in cheaper food became acutely focused on bread, to explain the part that fuel, rents, labor and transportation have come to play in the modern task of bread baking.

They cried that these basic costs must come down before the baker could follow flour up and down, barometrically, as he could under the old regime of the family unit in the bakery, or the small shop serving only a walking-distance trade.

But nowhere else was the case for the baker put in just the picturesque way that Justis B. Murray, a baker of Evansville, Indiana, put it to a local paper which questioned him.

"When flour sells at \$5 a barrel," he said, "and whole milk at 20 cents a gallon again, and gas for the pre-war price of 80 cents per 1,000 cubic feet, and taxes are put back to the 1916 level, with coal at 10 cents a bushel, help working at \$15 a week, and 20 loaves of bread buying a real dollar's worth of anything else, then I will sell one pound of bread again for 5 cents."

the texture is just so, the aroma and the flavor are just so. All flours are scientifically tested on purchase, and you get a bread that mother has been glad to welcome into her home.

"Think of the possibilities of one oven, at exactly the right temperature doing the work of 200,000 kitchen ovens at 200,000 different temperatures, each one under a stubborn or a willing fire being prodded up by a housewife in every one of the seventy-seven known varieties of exasperation.

The modern baker is so sure he has been bequeathed the task of baking the modern woman's modern loaf, that here at 1135 Fullerton Avenue, Chicago, we have opened a School for Bakers. We welcome here young men whose college degree of A.B., when they finish will mean A Baker. The modern bakery has a need for such men.

"Research laboratories located here are giving the baker exact data in place of every former intuition and scientific guess as to what was right. Last night I attended a meeting of a scientific society at which more professional women chemists were present than men. And I was glad that the modern baker was helping to unchain such women from the dough pan.

"So please do not call womankind back to their former drudgery, any more than you would to the spinning wheel, the wash-tub, or the knitting needles.

"Yours very truly,

"H. E. BARNARD,

"Director American Institute of Baking."



# The That It Is Delivered

[Lift from the Staples—Tear  
along double line, and send  
to your Local Editor]

## BREAD WAR WAS COSTLY LUXURY ON WEST COAST

**Bakers Lived to Learn That Rising Costs Overwhelmed Them With Heavy Losses at Low Selling Price**

That the bakeries of Seattle may be compelled to raise the price of bread within the next few days, as a result of what they call a climbing market on wheat, flour, lard, sugar and other ingredients, was the statement made Thursday to The Star by officials of certain local baking plants.

Washington flour has been advanced three times during the last 10 days, they said, and Montana flour, a percentage of which is used in the making of bakers' bread, has advanced \$1.20 a barrel since the first of the year. Sugar has gone up almost \$1 per hundredweight from the low mark, they said, and there has been an advance of two cents a pound in lard, with a corresponding increase in other shortenings.

These bakers declare that, even at the former low prices of materials, they have been losing money since bread was reduced in price November 11. They say that the cut in price was too deep for them to stand, and that bread is selling in Seattle today for less money than in any other city on the coast. In Portland and Tacoma the wholesale price is seven cents a pound loaf and 10½ cents a pound and a half loaf, while in Seattle the price is six and nine cents, respectively, according to their figures.

"We are trying to keep the prices down as long as we can," said Gust E. Rasmussen, president of the Seattle Baking Company, but the advancing markets may compel us to announce an advance shortly. The flour mills are doing so, and we may be compelled to follow."

Harry Mosler, head of the Western Bakeries, Inc., said: "I am convinced that every bakery in Seattle has been losing money during the low price period of the past two months, and now, with the prices of all materials going up, we may be forced to advance, at least to the level of Portland and Tacoma."

"It is utterly impossible for many of the bakers of Seattle to maintain the present prices for very long," said B. C. Barnes, of the Barnes Baking Company, who is president of the local bakers' association. "As a matter of fact there never was any real justification for such prices as have prevailed here recently."

## BREAD THE BASIS OF PERFECT FOOD SAYS AN EXPERT

**Edward G. Lowry Explains in Saturday Evening Post Why This Is So**

The amount of food consumed by the population of seven of the largest cities of the United States is incredible. This is handled at some length in a recent article in the Saturday Evening Post by Edward G. Lowry.

"They don't produce any food; they just consume it—and pay for it," so the writer says. "Well, there's plenty of it for them to eat this winter. And if they don't believe that's good news, just let them go over and ask somebody in Petrograd, Vienna or Warsaw."

Food needs and food values have been emphasized to the people by the war and resultant conditions, as never before.

Bread is at last recognized as a food of foods, and has come into its own place of paramount importance in the diet.

Science now tells us that bread, weight for weight, furnishes one-third more food value than meat, and at one-tenth the cost of meat. Moreover, every bit of its nutrition is almost immediately available as sustenance.

In spite of the wide publicity given to the nutritive value of this peer of foods, Americans are still consuming only about one-half the amount which is desirable both from the standpoint of health and economy.

Bread contains all the food elements, in the proper proportions, that are necessary for sustaining life, rebuilding tissues and supplying energy for daily activities.

It's easy to be seen that with bread as the basis of the diet, not only would the individual be better nourished, but his living costs would be substantially decreased. And still the high standard of variety and palatability of all meals could be maintained.

Bread can be made a tremendous factor in the achievement of greater thrift. During this period of reconstruction, while the nation is struggling to put our economic life on a firmer basis, it's clearly up to the American people to prove the advantage of more bread-eating.

## SAYS HIGH RENTS HELP KEEP UP PRICE OF BREAD

**H. E. Barnard, Director of Baking Institute, Explains 5-Cent Loaf Frauds**

Chicago, Ill., February —Newspaper readers in all parts of the country were regaled a few weeks ago with pretty pictures showing happy women buying 5-cent loaves of bread. The pictures did not explain that the 5-cent loaves were on sale in a chain store that used them instead of trading stamps to gain new trade.

But now comes the bread baker with his side of the story. H. E. Barnard, director of the American Institute of Baking, with headquarters at 1135 Fullerton Avenue, Chicago, declared in a statement to the press here that he had personally inspected the bills rendered by a local baker and the checks received in payment by him from a retailer of 5-cent loaves. These bits of evidence disclosed that the retailer was using trading-stamp principles with bread as the bait.

To the Louisville Herald, one of the papers which printed the pretty picture of the 5-cent loaf transaction in New York, Dr. Barnard wrote:

"You printed in your paper some weeks back a rather alluring picture showing a 5-cent loaf being handed out over the counter of a New York store."

"We have had many such loaves on sale in Chicago under the same conditions as those sold in New York. And I am taking the liberty of writing to you about them, not because we do not want to see the 5-cent loaf come back, but because we know it has not come back—in legitimate merchandising—up to the present time."

"There is an old saying that if you do not pay your way from the cradle to the grave somebody else will have to pay it for you. What has happened in bread is that in certain places merchants have found somebody else to pay the way for bread."

"That is, they once gave trading stamps. Now they give a cent off bread, or two or three cents off. And in every case where bread has been reduced to 5 cents and below, we have found that they were using it as a catch-trade or in place of trading stamps, and charging losses to advertising."

"In Chicago they got down to 2 cents a loaf and we found that the baker selling this bread to the retailer received 7 cents a loaf for it."

"The retailer counted on it bringing a lot of trade into his store."

"In New York bread played the same roll and your picture was probably taken in a chain store which did not care whether bread paid its way or not as he could charge losses to advertising and make excess profits on other sales induced upon the seeker after a 5-cent loaf."



# Do American Bakers Need A Voice?

*If So, Here Is a Blank for You to Sign and Mail in to Us*

**T**O ANY baker who will look up from his shop problems to the great world around him, the vision obtained is sure to be one of marshaled industries, each with its committees at work in some central headquarters, digging at those problems which only the industry as a whole can solve.

If efforts are made to drive down your prices, regardless of costs, on the pretense that "in Chicago or New York they have a cheap loaf of bread," where can you appeal to get the facts of the case?

Until recently you could appeal nowhere. But now the offices of Baking Technology are filled with data on every condition that affects the baking industry, from the Congressional war over a new tariff, to the latest drive for new laws in half a dozen different states.

This data we print for the benefit of all bakers everywhere. You can't tell when you will most need it. From this issue

you will learn that the much vaunted and universally heralded five-cent loaf has disappeared from Chicago. When they hound you again with the question, "If Chicago can do it why can't you?" you now have your answer.

"Chicago only did it in a trading stamp way and even that petered out for the chain stores have gone back to a more self-sustaining price."

A weak subscription list to Baking Technology means a weak voice for our industry. If bakers everywhere read alike from the same data they will learn to think alike on many vital problems, about which the whole truth will be told in a searching manner in this magazine.

It deserves your subscription, and your intensive criticism at all times, because only in this way can it do its part. It is YOUR magazine, always, and nobody's else.

Cut out and mail today with your check. Delay may mean that you will be unable to secure the first number.

## SUBSCRIBER'S APPLICATION

Baking Technology,  
The American Institute of Baking,  
1135 Fullerton Ave.,  
Chicago, Ill.

I wish to subscribe to Baking Technology and enclose my check for Five Dollars, in payment of my subscription for 1922.

Name.....

Address.....

# Why Bleached Flour?

*The Question Is Found to Be of Recent Origin*

## PART I

IT IS well known in the literature of milling that formerly a yellowish tint was considered desirable in the highest grade of flour. (Kick, 1871.) Coincident with the introduction of the roller process, public taste seemed rapidly to change, as was noted in the "Supplement" to Kick's book published in 1883. (Alway, 1907.) "Now the flour merchant demands the whitest possible flour and consequently the miller has to make it; and the important question for him is, How can I best make the patent flour of the desired color? Whether the demand is rational, however, is of no consequence to him. Many kinds of wheat produce flour with a yellow tinge, other flour with a gray tinge, but it can not be said that these appearances indicate either richness in gluten with hard wheat or poorness in gluten with soft wheat. These appearances have apparently no connection with the richness in gluten."

Improvements in milling technique led to attempts directed toward the betterment of the external properties of the flour, especially in reference to the color. The consumer soon became used to the grades of flour with a better color produced by improvements in the roller process, but in order to satisfy this demand the miller became interested in chemical and other methods with a view to more rapid production. The other side of the problem which has been advocated to explain artificial treatments for this purpose, such as improving the baking quality of the flour, aging, etc., were in the beginning only of secondary importance. (Kozmin, 1917.)

Methods for improving, whitening or bleaching flour may be divided for convenience into three groups; (1) treatment in cleaning, conditioning and milling the wheat; (2) flour storage or natural bleaching; (3) artificial bleaching by the use of chemical or electrical agents. (Amos, 1915.) The first and second methods are concerned with milling technique and flour storage and will not be considered here.

The artificial bleaching of cereal products was first proposed many years ago. Sulphur dioxide and chlorine were both mentioned as suitable reagents. The British patent No. 2502 issued to Beans in 1879 is one of the early references to chlorine as a bleaching agent. (Avery, 1907.)

The modern bleaching of flour by artificial treatment appears to date back to the French patent No. 277,751 granted to Frichot, which disclosed the use of nascent oxygen. Ozone is especially mentioned as the bleaching agent which was to be generated by an electric discharge.

In 1901, British patent No. 1661 was issued to J. & S. Andrews. This process subjected the flour to the action "of a suitable gaseous oxidising agent." Nitrogen peroxide, chlorine and bromine were named in this patent.

The patents granted to J. N. Alsop, British 14,006 of 1903, and United States No. 759,651 of 1904, disclose the use of air treated by "the action of an arc, or flaming discharge of electricity." Peculiar effects were claimed for the process at that time, relating to an increase in proteins and a decrease in ash and starch.



These claims were subsequently withdrawn.

The introduction of artificial bleaching processes into American flour mills, seems to date from about the time of the first Alsop patents. (Avery, 1907.) In 1903 no mills in this country were artificially bleaching flour. (Gudeman, 1903.) "Chemical bleaching, as far as known to the author, is not practiced in this country. It is, however, to some extent in European countries, and has been advocated in this country." (Snyder, 1904.)

Artificial flour bleaching in the United States is thus of comparatively recent origin, and as might be expected when first brought to the attention of American chemists, millers and bakers, excited much interest which rapidly assumed a controversial aspect, that still continues among investigators and others interested in the problem.

### *When Process Started*

Some of the first samples of flour treated by these new bleaching processes were examined by Dr. Gudeman of Chicago, Prof. Snyder of Minneapolis and Victor Goetz of St. Louis. (Modern Miller, 1903.) Dr. Wesener and Prof. Teller of Chicago also examined samples of the Andrews' process flours. (Operative Miller, 1904.) In England Prof. Jago examined the treatment of flour by the Andrews' patent in 1903, while Continental investigators, Brahm in Germany, Balland and Fleurent in France, published studies on the bleaching of flour during this period of interest.

Patent processes for flour bleaching developed rapidly after 1904 and gradually made their way into the mills. The tendency at this time was chiefly towards the use of nitrogen peroxide as the bleaching agent. Nitrogen peroxide generated by the action of chemicals was soon rapidly

displaced by electrical processes for its production.

Prof. Snyder states that "of the various methods proposed for the bleaching of flour practically the only one that has survived the experimental stage is the nitrogen peroxide process in which the bleaching reagent is produced directly from the union of the nitrogen and oxygen of the air by electrical means." (1908)

In this country the application of electrical methods commanded much attention and the patents of Nordyke and Marmon, J. E. Mitchell and E. E. Werner may be cited as developments of interest in this connection. It was not until later that the applications of chlorine and certain other reagents made any pronounced headway in the American flour mills.

One of the best known of the electrical processes which was developed from the early Alsop patents and embraces later developments, previously referred to, is now controlled by the Alsop Process Company.

### *Term in Disfavor*

At the present time the term "bleaching" does not appear to be used in connection with the advertisements of this process, and special emphasis is placed on the phrase "aging flour artificially." This expression is not only used in connection with this pioneer process of flour treatment, but is also used in connection with other and later developments which apply chlorine and its derivatives for the same purpose. It will be of interest to the baker to know that there seems to be a certain degree of disfavor attached to the term "bleached flour."

While this phrase is used by food control officials, chemists and physiologists and persists in the literature and discussions of flour treatments, it seems to have disappeared from the vocabulary of the advertiser. This tendency on the part of

the exploiters of processes for treating flour is in distinct contrast to the earlier one which emphasized the improvement of flour color by bleaching reagents and regarded "aging" as of secondary importance.

It may be admitted, however, that it is indeed difficult to coin or derive a term that will be sufficiently descriptive of the changes that take place when flour is treated by such processes. Prof. Jago has stated that the "general changes induced in flour by this oxidising process lead one to the conclusion that in many ways the changes are very similar to those resulting from age," while on the other hand, Willard (1911.) states that artificial bleaching cannot be the equivalent of natural aging.

The effect of nitrogen peroxide on flour has been the subject of considerable investigation. F. J. Alway has summarized the early studies of Snyder, Ladd, Willard, and Avery in the United States, Ballard and Fleurent in France, and Brahm in Germany. The work of the seven chemists mentioned led to the following conclusions:

1. Both chlorine and sulphur dioxide, while whitening the flour, so injuriously affect its qualities that their use for commercial purposes is excluded.

2. Bromine bleaches satisfactorily, but its influence on the baking qualities of flour is unknown. It is to be expected, however, that in this respect, as in most others, it will resemble chlorine.

3. Ozone not only fails to bleach but imparts an objectionable odor to the flour.

4. Nitrogen peroxide is the sole bleaching agent used on a commercial scale. There was little agreement as to the effects of nitrogen peroxide upon the flours. All recognized that there was no appreciable change in chemical composition, but, as to the effect of the bleaching upon the acidity, the color, the absorption, the taste, the odor, and the baking qualities there was no agreement. Fleurent and Ladd expressed widely different views as to the wholesomeness of the bleached flour. (Alway, 1907.)

It will be noted that at this period in the development of flour bleaching these investigators were not impressed with the possibilities of commercial application of chlorine.

### *Detecting Nitrogen Peroxide*

Alway studied the Griess-Ilosvay test which had been previously used by Willard and also by Ladd for the detection of nitrogen peroxide bleached flour, (Alway and Gortner, 1907.) and concluded that all flours bleached by this compound gave a "pink coloration, while unbleached flours gave no coloration," and recognized the fact that "only when extreme precautions are taken is this test reliable."

Bleached flours lying alongside unbleached flours did not give off any substance which affected the latter so that they gave the test for bleached flour. This observation was contrary to that of Ladd (1906), who found that unbleached flour placed between bags of bleached flour soon gave the nitrite reaction.

The amount of nitrites present in the bleached flours examined by Alway averaged 6.3 parts per million, and was proportional to the amount of nitrogen peroxide applied. Low grade flours were not bleached so as to resemble a patent flour.

No general relation appeared to exist between the color of mill bleached flours and the quantity of nitrites present. The absorption of the flour and the expansion of its gluten was not affected by bleaching.

The bread made from the bleached flours did not differ in weight, lightness, texture, odor or taste from that made from unbleached flours. It was whiter where high grade flours were used, but low grade bleached flours did not produce bread of good color. The presence of nitrites in the bread was detected in some cases but negative results were obtained in others. In all cases the amount of ni-



trites found in the bread was smaller than that in the flour.

Alway attached no significance to the presence of nitrites in bread from the standpoint of injury to health. He attributes many of the conflicting opinions on the effects of nitrogen peroxide on wheat flour to the investigation of flours that had been overbleached.

The work of Ladd and Stallings, (1906.) was strongly averse to bleached flour and mainly contrary to the later conclusions of Alway (1907), which have just been outlined.

### *Dr. Ladd's View*

In July, 1907, Dr. Ladd delivered an address before the convention of the Association of State and National Food and Dairy Officials at Jamestown, Va., which was strongly antagonistic to bleached flour. Dr. Ladd asserted that the gluten of flour was always injured by bleaching; the extent of the injury depending upon the degree of bleaching; that the quality of the flour was also injured, that its characteristic and satisfying flavor was lessened, and in overbleached flour largely destroyed. There were fourteen points in Dr. Ladd's indictment of bleached flour which immediately aroused much opposition. Wesener and Teller, (1907.) among others, replied to Dr. Ladd in defense of bleached flour and the controversy became of acute interest to food officials and chemists.

In September of 1907, Dr. Ladd issued his Circular No. 1, which prohibited the sale of "bleached flour containing any residue of nitrogen absorption, addition, or substitution products and intended for consumption within the State of North Dakota," on and after October 1, 1907. "All other flour bleached by any chemical process or agent, and containing no added residual products," was required to be

labeled as "Bleached." This order did not prohibit or restrict the use of bleaching agents in flour and milling products for shipments outside the state of North Dakota.

Snyder, (1908.) made an intensive study of flour bleaching, the conclusions of which were in marked disagreement with the position of Ladd. This investigation was conducted at the Minnesota Experiment Station where a small electrical bleaching machine was operated in connection with an experimental flour mill. Prof. Snyder found that flours purchased on the market, bleached by electrical processes generally yielded from 0.3 to 0.8 parts of nitrogen as nitrite reacting material, per million parts of flour. The average amount was about 0.4 parts per million; 100,000 parts of air containing from about 4 to 8 parts of nitrogen peroxide effectually bleached the flour. Such treatment left less than one part per million of nitrogen as nitrite reacting material in the flour.

The fat from bleached and unbleached flours milled from the same wheat was found to be identical in iodine absorption number, nitrogen content, and heat of combustion.

### *Glutens Were Identical*

The glutens from the bleached and unbleached flours were identical in physical properties. Nitrogen peroxide in the small amount produced by electrical bleaching acts upon the coloring matter of the flour. The action is an oxidizing one, the peroxide behaving as an oxygen carrier.

The nitrite reacting material in the flour was considered by Snyder to be in physical rather than chemical combination. It "can be accounted for as soluble and volatile nitrites in the flour and in the air surrounding the flour, leaving no nitrite

reacting material to combine with the fat or gluten."

No relation was found to exist between the nitrite reacting material in the flour and the bread. "Bread cannot contain any appreciable amount of nitrite reacting material, as the carbon dioxide and organic acids produced during bread making liberate nitrites."

"In fifteen digestion experiments with men no difference whatever was observed in the digestibility of breads from bleached and unbleached flour," and exerted no influence on the amount of nutrients absorbed and digested.

"A kerosene lamp will produce in one hour .00027 grams of nitrite nitrogen. This is over five times more than is present in a pound of average sample of commercially bleached flour. Nitrites are produced as a result of combustion of all fuels and organic substances containing nitrogen. Flour exposed to wood smoke for a few minutes will contain more nitrites than when electrically bleached. Foods prepared by recognized and approved methods, as smoking of meats, contain nitrites. Salted, smoked and cured bacon, hams and similar meats, contain much larger amounts of nitrites than bleached flour.

Nitrites are present in traces in air and in large amounts in ventilated living rooms where gas or kerosene is burned. Nitrites are constituents of rain water, of many drinking waters, and of vegetable foods such as celery, lettuce and spinach in the earlier stages of growth. Nitrites are also occasionally found naturally in wheat. They are a normal constituent of saliva and with nitrates are often found in milk where the cows have been fed liberally on roots.

"In bread-making tests of commercially bleached flours no difference whatever was observed between the breads pro-

duced from the bleached and unbleached flours milled from the same wheats except that the bleached flours produced a whiter bread and also showed a tendency to produce larger sized loaves. Bleaching of the flour did not impart any odor or taste to the bread or leave in it any residue.

The bleaching of flour enables the miller to manufacture a more uniform product and to place his flour directly on the market without necessitating its undergoing bleaching and curing in storage. No difference whatever was observed between the naturally bleached flours and those bleached by the electrical process except that the latter contained traces of nitrite reacting materials which were expelled during bread making.

"The bleaching of flour has a slightly drying effect resulting in the consumer receiving a proportionately larger amount of dry matter in the flour."

C. B. MORISON.

(To be continued in the next issue.)

### *A Mill That Kept Ahead of the Times*

There is at least one textile mill in America which has continued to run at capacity. It has experienced no season of slack orders and it has made no reduction in its scientific staff. The president of this mill—Joseph Bancroft & Sons Co.—tells us that this success has been due to the fact that his scientists by continued research have kept his mill four or five years ahead of the procession. He is producing materials that have no competition. He is offering uniquely dyed fabrics which are in a class by themselves and when there is a buyers' market, a mill in this position has an unusual advantage. The president of this mill proposes to increase research, for he knows he cannot possibly afford to curtail it.—*From the Journal of Industrial and Engineering Chemistry.*

There are in our own industry many bread baking establishments of which a tale like that could be told. The day of control over baking materials in the research laboratory is not far distant in any corner of our land.



# From Soil to Consumer

*The Story of Bread in the Making, As Seen by a Baking Chemist*

## PART 1—WHEAT FROM FARM TO THE MILLERS' BINS

WITH the beginning of time there also began, so far as historians can discover, the human intake of wheat. Other foods have come and gone in popularity. Manna served the Children of Israel for a time, but it passed, and they turned again to wheat, and bread from its kneaded dough.

Today, no less than when the first mill stone was hewn from some rough boulder, the world's prime food is wheat. We can almost say that the steps of civilization are marked by its various advances in the art of grinding and utilizing wheat.

The different types of wheat vary in their quality and ability to produce different food products. This variation, no doubt, is due to the same thing which has a bearing on the human make-up—environment.

Climatic and soil conditions cause these variations. In Ohio, Michigan and Wisconsin wheat is grown that at present is only thought to be good for pastry. Missouri grows a soft wheat which comes a little closer to the hard wheats grown in Kansas, Minnesota, Oklahoma, part of Nebraska and Dakota, but is still better suited for pastries. We find a semi-soft wheat in Eastern Kansas, Nebraska and Texas and a soft wheat in the Walla Walla Valley.

The soft wheats are usually very starchy with low protein and mineral content, making a flour of whiter color and weighing more per bushel.

The Durum and Nebraska Yellow Berry with some others produce a flour of medium starch and ash content and a high carotin content which makes a flour very

yellow in color. It must be bleached in order to bring market prices. The Durum wheats, of course, are used almost exclusively for macaroni.

The Minnesota Wheats produce a flour a little whiter and clearer in color than the Kansas and Oklahoma wheats, but the Minnesota flour does not excel them in baking quality.

If any of the wheats undergo a very dry period during the time of ripening, they will produce a low yield per acre and a light wheat (in pounds per bushel) with a high protein and low starch content.

If a wet ripening season is experienced, the wheat will give a good acreage yield and high weight per bushel, with high starch and low protein contents.

The mineral content of the soil has a direct bearing on all types of wheat.

All these conditions go to make even the same types of wheat vary in the baking value of the flour produced, and it is imperative that the miller keep a close watch of the wheat purchased.

The miller watches the climatic condition of the section of the wheat country from which he will draw his wheat supply for the coming crop year. He then obtains small samples of wheat from the farmer and country elevators just as soon as the wheat is thrashed. These samples are analyzed for protein and moisture content.

The best samples are selected and a larger sample obtained from the same territories. These samples are run for the protein and moisture contents to check previous results and, in addition, they are

milled on the experimental mill into a 95 per cent flour. In this way their baking value is determined. Three or four of the best of these different types are selected, blended together and milled to find the baking value of a mill mixture of wheat the miller will be able to obtain for the entire crop year. The percentage of each wheat in the blend is found by experiments.

Usually a dark hard wheat of high protein content is the basis of the mix with a semi-hard wheat to tone down the gluten-bound condition characteristic of the dark hard wheat. It is possible, and it often happens, that in order to obtain the flour of best baking quality, it is necessary to use a wheat which produces a flour of very yellow color. In this case the finished flour is usually bleached to obtain balance and color.

The chemist or head miller tells the wheat buyer the amount of the different types wanted. As the wheat reaches the switch yards, it is sampled, taken to the laboratory and run for protein and moisture content. In this work any of the well-known nitrogen methods may be employed; in addition to the Brown-Duvel moisture determination method.

These results are used in storing or binning the wheat.

In making the mill mix ready for the mill the predetermined percentage of each type of wheat is blended together. A sample of this mixture is taken to the laboratory and analyzed for protein and moisture content. If the protein content is too low or too high, semi-dark or dark wheat is added as required to bring the entire mixture to the proper standard.

It is pretty generally understood that where such a method is used and the protein content is obtained which produces the best flour from a baking standpoint, that so long as the same types of

wheats are used, the protein will remain as the most constant factor to use as a control of uniformity.

The moisture content of the mixture is obtained to find the amount of water to use in tempering. Previous to the time of adding the water the wheat is cleaned by separators and scourers.

The tempering of wheat is for the purpose of producing a better yield by obtaining a more perfect separation of the bran and feed from the flour. This makes it whiter and cleaner. It also increases the baking quality, since there is some hydrolysis during tempering. The cause of the better separation is the toughening action which water has on the outer layers of the wheat berry causing the bran to come off in large flakes.

The time of tempering varies from six to sixty hours. This is caused by the different ideas the millers have as to the value of tempering. Some millers use a twenty-four-hour first temper and a four to six-hour second temper. The second temper with steamer just ahead of the first break rolls causes a further toughening of the bran and a better finished product. The total amount of tempering is never usually more than 15.5 per cent of water in the wheat as it goes to the rolls. There is a varying amount of loss in evaporation during milling and it is not safe to have more than 13.50 per cent of moisture in the finished flour at the time of packing.

A wet harvest produces a wheat with a high moisture content and the miller is only able to lightly temper his wheat. A dry harvest allows him to temper it heavily.

This brings the wheat to the rolls ready for grinding.

The process of milling will follow in the second article in this series.

C. J. PATTERSON.



# How a Baker Was Deceived

*Without Laboratory Aid He Tried to Bake Diabetic Bread and Found Labels Were Misleading*

IT is the general consensus of scientific opinion among medical and food authorities that products intended for sale to the diabetic patient should be standardized. That is, the label must tell the truth. It should bear a clear and correct statement of the weight of the product, and the percentages of protein, fat and carbohydrates that it contains. Some authorities believe that it should also include a statement of the different carbohydrates present: starch, glucose, lactose, etc. In addition to these requirements the process of manufacture must be standardized so that the composition of the product will be as nearly uniform as it is possible to maintain it, which, of course, follows if the raw material, formula and process are subjected to rigid control.

In order to succeed in these requirements the responsible baker or other food manufacturer must have the benefit of scientific assistance either from his own chemist or from others.

The laboratories of the American Institute of Baking give this service to the baking industry. The following example of how a baker may unknowingly use an illegal and unstandardized flour for the preparation of a "gluten" bread for dia-

betics is of much interest in showing how the Institute can help the baker in such matters.

A short time ago the Institute received this inquiry from a baker who realized his responsibilities in making bread for diabetic patients: "A local miller told me it was waste to pay so much for gluten flour. He could furnish it to me for half by simply taking the flour from the second or third roll before it had advanced in its refining stages. He claimed that the gluten content in this flour was much greater than in the ——— 'gluten flour,' and I would be pleased to have you analyze this flour and tell me if this flour is really gluten flour as compared with standard gluten flours." The baker also sent a sample of

the bread made from this flour.

An analysis of the flour was made in the Institute laboratories.

## Analysis of a Mill Product Sold as Gluten Flour

As Received	Calculated to Dry Basis
Moisture ..... 10.75%	Protein ..... 23.79%
Protein ..... 21.23%	Ether Extract
Ether Extract	(Fat) ..... 2.82%
(Fat) ..... 2.52%	Nitrogen Free
Nitrogen Free	Extract .... 71.68%
Extract .... 63.97%	Crude Fiber... 0.75%
Crude Fiber... 0.67%	Ash ..... 0.96%
Ash ..... 0.86%	
100.00%	100.00%

## Laboratory Help

### And What It Did For an Inquiring Baker

The far-sighted and forward-looking bakers who did most to establish the American Institute of Baking were bakers who had seen the value of scientific research in their own private plants.

In the story herewith presented is told the experience of one baker who tried the "rule of thumb" in buying materials by label, and found that it did not work.

Then he started over by appeal for laboratory service. He found what was wrong, corrected it, and is now able to serve his public with a product that cannot fail those who depend upon it in their search for health. It is a story we will duplicate many hundreds of times as our work gets under way.

This analysis shows that the flour sold to our correspondent is not in any sense a "gluten flour," for, according to the Federal definition (U. S. Dept. of Agr., Food Inspection Decision 160.): "Gluten flour is the clean, sound product made from wheat flour by the removal of a large part of the starch and contains not more than ten per cent (10%) of moisture and, calculated on the water-free basis, not less than seven and one-tenth per cent (7.1%) of nitrogen, not more than fifty-six per cent (56%) of nitrogen-free extract (using the protein factor 5.7) and not more than forty-four per cent (44%) of starch (as determined by the diastase method)."

Our analysis indicates that the flour is slightly high in moisture, low in protein and high in nitrogen-free extract. It does not conform to the Federal definition and cannot be sold as a "gluten flour."

The bread baked from this flour was analyzed and its composition found to be as follows:

Analysis of Bread

	As Received	Calculated to Dry Basis	Ordinary White Bread Calculated to Dry Basis
Moisture .....	32.14%	.....	.....
Protein .....	16.92%	24.93%	14.22%
Ether Extract (Fat) .....	1.86%	2.74%	2.02%
Nitrogen Free Extract .....	46.61%	68.69%	81.30%
Crude Fiber .....	1.09%	1.61%	.75%
Ash .....	1.38%	2.03%	1.71%
	100.00%	100.00%	100.00%

It will be noted that this analysis shows a nitrogen-free extract of 46.61 per cent, or 68.69 per cent on the dry basis. Ordinary white bread, made from patent flour, contains about 80 per cent to 81 per cent of nitrogen-free extract, so that the bread sent in for examination contained about four-fifths as much carbohydrates as are found in ordinary white bread.

This amount of carbohydrates is too high for a commercial "diabetic food," which, under the Federal definition, should contain not more than one-half as much glycogenic carbohydrate as normal food of the same class.

A diabetic patient who might be unfortunate enough to purchase this product under the representation or supposition that it contained about half the carbohydrates of white bread would be victimized. In view of this uncertainty regarding composition, many physicians have abandoned gluten flours and breads and rely upon certain staple products the composition of which is uniform.

The Institute has advised the baker of the real facts in this case and has suggested that the product be withdrawn from sale. A flour complying with the Federal definition will be recommended, together with an approved formula for its use, so that the resulting product will be of standard and uniform composition.

C. B. M.

A Boquet from a Friend

VERY attractive and well balanced from a typographical standpoint, and no less admirable in the character and merit of its contents, is the new monthly journal published by the American Institute of Baking.

It contains matter of real importance and value to bakers, and the subscription price, five dollars a year, is a reasonable charge for the information which it so admirably and concisely presents. Baking Technology, both in appearance and contents, dignifies the industry it represents, and should prove invaluable to the American Institute of Baking as a means of keeping in close contact with its supporters.—The Northwestern Miller.



# The School Trained Baker

*In an Era of Machine Methods He Is Giving Modern Bakeries  
Intelligent Direction*

THE Baking Industry is in a state of progressive growth. An old art is being performed in a new way. Hand methods are yielding to the machine, uncertain guesses are becoming predetermined certainties, and where once was much lack of control there now exists a demand for standardization and rigid adherence to schedule.

Such conditions demand intelligent and trained direction, which is not a usual outcome of practical experience alone, no matter how extended or varied. This does not mean that practical experience is to be discounted. Nothing has greater value than familiarity with trade problems through personal contact. But modern industrial conditions require more than average ability, and the foreman or superintendent who does not supplement his fund of practical knowledge with an understanding of the technical and scientific side of his trade will soon find himself outmatched by his trained competitor, who wins out in spite of his lack of long years of apprenticeship.

The Baking Industry is rapidly accepting the help and guidance of the mechanical engineer, the food chemist, the sanitary expert and the industrial technologist. It is not concerned simply with turning out the best bread under existing circumstances, but rather is it desirous of baking the best bread which can be turned out under any circumstances.

In order to accomplish these results men whose minds have been trained along these special lines must be available. Such men are rarely if ever the product of the commercial plant, and those exceptions who do not succeed in grasping and un-

derstanding the required new information while on the job, do so at an unnecessarily great effort and at a great loss of time. It is far more efficient to take the promising baker out of the shop and send him to an institution designed for the specific purpose of training him to fit better than ever into the needs of the trade. Such an institution is the School of the American Institute of Baking.

Here, in a few months, properly qualified men of previous experience are trained to return to their work **fitted to make better bread**. It must not be lost sight of in all this discussion of the application of science to industry that no good would result if it did not make it possible to produce better, more uniformly and more economically, the bread the sale of which constitutes the backbone of the industry.

But to produce this bread today requires not only the manual ability of the apprentice but also a full knowledge of the effect of variation of conditions and ingredients; knowledge of the nature, qualities and uses of the many materials found in bread mixes; knowledge of the latest developments in machinery and processes; knowledge of simple methods of testing to assure uniformity and to discover changes during storage; and information regarding industrial relations, laws, records, shop troubles and a thousand and one other matters, all new and in process of development, but nevertheless intimately tied into the baking of bread. The baking foreman and superintendent must know all these things, and all of them he may learn in his School of Baking.

Assisting the production man in the bread industry are two other men who must be trained to work hand in hand with the practical superintendent, but whose work is nevertheless of such a nature that special instruction along particular lines is required. These men are the control chemist, who acts in connection with the purchasing and control of materials, and the research chemist, whose function is the investigation of special problems of scientific research in baking laboratories. Sometimes the production superintendent and the control chemist may be one man, but this is not usual. More often they are distinct individuals, and in practically all cases the research man must be specially trained.

In conclusion, then, we find that the School of Baking supplies three men greatly needed by the industry. These are (1) the Production Superintendent, trained to go back into his trade equipped with knowledge to make better bread and to understand more fully the new commercial conditions; (2) the Control Chemist, to assist in and control the purchase and use of ingredients and processes; (3) and the Research Chemist, trained to attack and solve the new and unknown problem.

P. G. P.

### *A Photo to Hang on Your Bakery Wall*

IF THE bakers of America do not look up with pride to the standards of their own industry who will do it for them?

"We acknowledge receipt of the photograph of our industry's new home," writes the head of Moody & Waters, intelligent bakers of pies, at 1107 West Congress Street, Chicago, "and if it ever befalls your lot to be in our neighborhood we would ask that you kindly step in and see the photograph adorning our walls."

That is the kind of a letter that makes the heads of the American Institute of Baking glad they had this photograph made. Any baker who desires a copy to frame and hang in his bakery is welcome to one if he will write in for it.

### *"Ads" and Industries*

THERE is one idea in business almost as old as the caveat emptor principle, and that is hostility to a competitor. The desire to gain some great end by advertising has brought groups of competitors together. This great end is the one of educating the public to be better customers. Cement manufacturers have learned that it is better to teach more people to use concrete construction than to fight each other for the smaller existing trade. Under the Aegis of advertising, paint manufacturers, tile makers, orange growers, raisin dryers, lumber men, dairy men have joined the hand formerly lifted against one another. There is competition still, just as determined and far more intelligent than in the old days, but it is the competition of golf, all within the limits of a gentleman's game. Each one plays his own ball the best he knows how and when his competitor's ball is lost in the rough, he cheerfully joins in the search for it.

From an article by Ernest E. Calkins in the February number of the Review of Review.

### *From a Far Voyageur*

"I am glad that you have started Baking Technology. You can't tell us too much about bread, even though we are not in the Volga basin where the bread—what little there is of it—is black and green and sticky and altogether horrible. I brought back some of it to remind me always of my blessings."

Vernon Kellogg, in a letter upon his return from the black bread belt of the Volga.



## Books for the Baking Laboratory

**CONFECTIONERS' RAW MATERIALS:** Their sources, modes of preparation, chemical composition, the chief impurities and adulterations, their most important uses and other points of interest. By James Grant. V + 173 pp. 4 plates and 38 figures in the text. Longmans, Green & Co., New York. 1921. Price \$3.00.

**T**HIS work, by the author of the "Chemistry of Breadmaking," has been written to "supply a want that has been long felt in connection with so important a subject as "Confectioners' Raw Materials." In England the term "confectioner" is applied to manufacturers of sweet goods, cake and pastries and to the American baker the title of Prof. Grant's book is somewhat misleading. In this country the term "confectioner" is applied popularly to the candy maker. The author has attempted to give in simple language an account for students of the materials used in the preparation of sweet goods, cakes and pastries.

Chapters from one to fourteen are devoted to a consideration of elementary chemistry; alcohols and alcoholic beverages used as flavoring materials, fat, butter, renovated butter, lard, margarine, nut butters and neutral fats; the carbohydrates, starch, cellulose, dextrins, vegetable gums, pectins, glucosides, flour; sugars, honey, glucoses, syrups, caramel, fondants; essential oils and essences; eggs and egg products; color and the coloring matters; aeration of goods; vegetable acids and nitrogenous matters; general methods of using raw materials, and the analysis of raw materials. A bibliography of special and general works is appended.

The book will be useful to the student in view of the lack of other works on this subject.

**THE VITAMINE MANUAL:** A Presentation of Essential Data About the New Food Factors. By Walter H. Eddy. 121 pp. Williams & Wilkins Co., Baltimore, 1921. Price \$2.50.

**T**HE baker has heard much about certain mysterious substances called vitamins during the last few years, particularly in relation to flour grades, yeast and bread. This concise manual of Dr. Eddy's presents in a clear and comprehensive way some of the essential facts on vitamins that have been ascertained by many investigators since their discovery by Funk a little over ten years ago.

Dr. Eddy tells us how vitamins were discovered, and of the attempts made to determine their chemical nature. The methods used in testing for the presence of vitamins are noted and special attention is given to the yeast test, which, in the opinion of some investigators, is not specific for vitamins. The sources of vitamins, their chemical and physiological properties and their utilization in the diet, are treated in separate chapters. The last chapter on the diseases that result from vitamin deficiencies are of great interest from the standpoint of health. An excellent bibliography is included.

The collection of the existing vitamin literature and its summary has been a difficult task, and this book will give the layman a most helpful guide to the essential facts on vitamins. The whole subject of vitamins is in too active a stage of investigation for hasty generalization and snap judgment, and a study of Dr. Eddy's book is suggested as an antidote for the sensationalism and misrepresentation that obscure much of the popular literature on vitamins.

C. B. M.

## Abstracts of Technical Articles

Selected for Baking Technology from  
*Chemical Abstracts*

NUTRITION AND GROWTH ON DIETS DEVOID OF TRUE FATS: J. C. Drummond and Katherine H. Coward, London. "Lancet" (1921) II, 698-700.

**Y**OUNG rats grown from weaning to maturity on diets deprived as far as possible of neutral fats have shown normal development and behaviour. It would appear that neutral fats, from a purely physiological standpoint, are dispensable constituents of a diet, provided a sufficiency of the vitamin frequently found in association with natural fats is contained in the other foodstuffs. E. B. Fink.

THE DIETETIC VALUE OF SUGAR: W. D. Horne. "Sugar" 23,603-4 (1921).

**A** table of values for sugar and other food products gives the relative value of these commodities as foods. The consumption of sugar has risen in the U. S. from 49.95 lb. per capita in 1885 to 86.56 lb. per capita in 1920. C. H. Christman.

NEW KNOWLEDGE ON ROPY BREAD AND THE ORGANISMS WHICH INDUCE THIS DECOMPOSITION. C. Brahm. "Z. ges. Getreidew." 13, 105-13 (1921).

**B**RAHM carefully reviews the investigations of Lloyd and also the facts known about this disease of bread. The investigation started by Brahm led to the isolation of 5 organisms belonging to the mesentericus group, which caused this disease when introduced into bread. These organisms could be easily isolated from flour and meal and the outside of loaves of bread which would indicate that they are always present in pastry products. They require an alk. reaction for development of "rope." The cultural properties of the organisms, which differed in no way from the usual spore-forming organisms found in this defect of bread, were determined. The following method was pro-

posed for showing the presence of significant spore-bearing bacteria in meal and flour. To 300 cc. of sterile water in a 500 cc. flask, add 100 g. of the meal and shake thoroughly. Then add 1 cc. of this meal emulsion to culture tubes of liquefied agar and heat in boiling water for 20 min. After this pour the contents of the tubes into sterile Petri dishes. After 24 hours incubation colonies of *B. mesentericus* will develop. Less than 12 colonies indicate that the flour is of no significance in this connection. Between 12 and 50 colonies indicates potential danger and more than 50 colonies indicates that the flour is unfit for bakery purposes. Factors which influence the formation of ropy bread are said to be degree of infection of the flour, moisture, temperature, the reaction of the bread and the composition of the loaf. F. W. T.

DETERMINATION OF DOUGH STRENGTH: Ig. Stainfaller. "Z. Getreidew." 13, 98-105 (1921).

**P**LACE 100 g. of dough on a glass ball (1 cc.) supported on a needle and time the interval until the ball protrudes through the dough. Tables and discussion showing effect of water in dough on time interval and relation to strength of dough are given. H. A. Lepper.

VARIATION IN MOISTURE CONTENT OF FLOUR DURING STORAGE: R. S. Herman and Walter Hall. "J. Am. Assoc. Cereal Chem." 6, No. 3, 10 (1921).

**D**DAILY results are given for H<sub>2</sub>O on a sample of flour stored for 1 month, with observations of temperature and humidity at time of sampling. H. A. Lepper.

A NEW TYPE OF LABORATORY BAKING OVEN FOR STANDING ON A TRIPOD: A. Fornet. "Chem. Ztg." 45, 1091-2 (1921).

**A**N incomplete description, with 2 cuts, of a small oven for making baking tests on breads. J. H. Moore.



# Know Your Materials!

*How American Institute of Baking's Service Laboratories Will Help You to Do It*

UNDER the caption "Know Your Materials," Baking Technology will each month tell the story of the work of the Service Laboratories of the Institute of Baking.

The facts as to the composition of the materials the baker uses can only be determined by an intelligent chemical analysis and their value in baking is best determined by their use in actual shop practice.

How can our laboratories best serve you?

## *Your Water Supply*

What do you know, for instance, about your water supply? Is it pure? If it is drawn from the tap of a public supply it is probably sanitarily good. If it is pumped from a well how do you know that it is not polluted? Water taken from the ground below long settled areas is almost sure to be loaded with the wastes of civilization and unfit to drink. Obviously water which is unfit to drink is unfit to use in the bakery. And is it of the proper hardness to give you the best results in the dough room? A lot of fermentation troubles start at the water tap. An analysis will answer every question concerning your water supply.

## *Many Kinds of Flour*

Do you buy the kind of flour you want for your particular method of handling your doughs or do you leave it to your flour broker to tell you what to buy? The trained baker knows what he wants and then sees that he gets it. That is another place where the Service Laboratory can help the baker. It can help the miller just as readily. Some mills know what

sort of flour they are making because they have their own laboratories. But other mills are still leaving the quality of their output to be determined by the skill of the miller's thumb. There may have been a time when a well trained thumb helped a lot in judging flour values but that time has passed. The richness of milk, the strength of steel, the elasticity of rubber, the purity of water is not guessed at any more. The baker should put his flour into the hands of the chemist too.

## *Quality of Yeast*

Is your yeast supply always satisfactory? You may depend on the quality of your fresh yeast but perhaps you have to store it a day or so before you use it. If so are your storage conditions proper? What changes take place in yeast in storage and how should it be kept to prevent undesirable changes?

How about the other materials you buy but which do not enter directly into your bread; are they best suited for your purpose? Are you using the proper fuel for your type of oven and the kind of heat you want? Are the lubricants and greases for your machinery of the proper composition? Are you paying a fancy price for a cleaning compound which our analysis might show could be substituted with equal effectiveness by something cheaper, without a trademark? When two samples of the same material are offered you at different prices, how will you know which is the better "buy"?

Send the samples to your Service Laboratories; our analysis will answer your question. And finally remember, DON'T GUESS—KNOW!!

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AT ag.

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association.*

Vol. I CHICAGO, ILLINOIS, APRIL 15th, 1922 No. 4

## The Coming Great Convention

NO BAKER can afford to feel that he faces the future well armed for success unless he KNOWS that his bakery is right up to date.

The next great chance to rub elbows with bakers from all over the land, and with the builders of machinery representing the latest word in profit-making equipment, will come early in September.

It is now time to mark off September as a month in which to visit Chicago, and bring friend wife.

In September the makers of bakers' machinery will dedicate Chicago's million dollar municipal pier to a new purpose.

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They will set up on the pier, which has never before been put to convention uses, the greatest display of baking machinery ever put under a single roof. It is done for the education of our industry.

At the same time, in meetings of the American Bakers Association—the exact dates will be announced very shortly—bakers will learn how to think of their industry in the terms of a marshaled in-

dustry, and to think of themselves as business men, meeting business problems the way members of all great industries meet them.



# Our Professor of Pumpernickle

*He Was Ridiculed by the Press, But His Dream for the Baking Industry Has Come True*

WHEN Geo. Haffner, of Fort Wayne, Ind., proposed some sixteen years ago that the baking of the people's bread was a science, and ought to be backed by university research, the standard bearers of the World of Education thought they had the joke of the age upon their hands.

"All hail, Doctor of Doughnuts," cried a Grand Rapids newspaper.

"Come on, you, Professor of Pumpernickle," set forth the brilliant organ of the educated, known as the New York Sun.

All that was sixteen-or-so years ago. And now there is a tale to tell about it in these days when bakers are not only bakers of bread, but business men who have professional pride in their industry and are building up its standards and its aims.

The tale, in one sense, is the tale of George Haffner that came true!

There is no Professor Pumpernickle to-day, but there are professional chemists of cerealogy. As these words are written another typewriter in the new home of the baking industry drafts into final form the thesis by which a university graduate who has served also in another university's faculty, will win the highest college degree any institution of learning can grant. His research was into the question of what happens in flour when those curious microscopic cells known as yeast cells get to work upon it. And what happens when diastatic enzymes attack a flour's strength.

All of this research work was done for a great university,—and done in the home of the American baking industry. The University of Minnesota was not among those learned institutions whose profes-

sors cried out in derision of the "Professor of Pumpernickle."

In another room in the baking industry's new home, while these words are written, Principal Peter G. Pirrie, of the American Institute's School of Baking, plats out his system of triplicate machinery installations. They are to acquaint the student with all standard types of baking machines.

Hammers resound through the building while workmen erect the new bakery where the ovens are to be installed for the training of bakers!

It is no bad dream, then, that George Haffner had sixteen years ago. It is time to proclaim that his dream has come true, just as the dream of Leonardo da Vinci, that man would one day fly, came true at Kittyhawk, in the soaring aloft of Wilbur and Orville Wright. Leonardo tried and tried in vain, but he wrote his name large across the heavens as a first pioneer in that important field.

"Man can do anything which he can imagine." Arthur Brisbane, who is the most read of the editorial writers of our day, so declares.

What was it George Haffner imagined that has now come true in part? For one thing, it was a baking industry controlled by men who had turned business men, and were possessed of craft pride and of pride for their industry. It was an industry led by unselfish men who saw the good of the whole industry, and were not buried so deep in their own dough pans that they could not see baking in its broad relationship to the civilization going on around it.

In the new home of the American bak-

ing industry are men who believe that the most pressing problem of the industry is to wake its masses of people up to the value of a marshaled industry,—to wake them up to the way that men may march in fellowship to the greater good of all, instead of being each so immersed in his own corner of the world that he can't see the movement of which he is a part.

The non-member—the non-joiner—the pouter who stays out because all is not 100 per cent to his liking, instead of coming in and working to iron out all difficulties—what of this group? They have no thrill of joy in the achievement that now thrills Haffner, of Fort Wayne.

Who will bring such folks along? Someone must find the way or they must find it for themselves. When they do come along Baking Technology will have 30,000 readers a month, for all will want to know the broadcasted problems that the whole industry must face with intelligence.

In the day that the American Institute's School of Baking fulfills George Haffner's dream, there comes, of course, a feeling of satisfaction to all scholars and true students everywhere.

In the dental colleges, for instance, they know what is to be sneered at as our Professor of Pumpnickle was. The learned scholars of the University of Pennsylvania did not believe that dental knowledge was of importance enough to justify a dental school. There was graduated a whole generation of physicians and surgeons before the heads of the university awoke to a realization of the fact that "mechanical dentistry" was not what our people needed.

Then they started over and dental colleges are now part of the medical schools, the country over.

The men of science, too, know what Geo. Haffner learned when he was dubbed

Doctor of Doughnuts, for Louis Agassiz was dubbed "professor of seaweed," or something like that when he began work in the modern science of zoology. Cornell University professors who were buried deep in the declensions of Latin verbs and nouns could not see where the study of animals could possibly be education.

Yet, from the muck in the bottom of a yeast vat, the British authorities compressed so many vitamins into small packages, suitable for aeroplane carriers, that they stopped scurvy outbreaks in the beleaguered garrisons of Mesopotamia. And this was done at a critical moment of the war.

All that we know about enzymes, vitamins, algae, and the hundreds of varieties of yeasts and moulds, we know because of Louis Agassiz and his successors in the study of animal and plant life. Today who would hurl a department of zoology out of a university as they hurled Agassiz out of Cornell?

David Starr Jordan built up Stanford University to teach as the heart and soul of the university curriculum just what Agassiz had taught him in a barn on an off-coast island on the Atlantic seaboard.

And neither at Stanford University nor at Woods Hole did the pioneer scientists ever gain contact with problems nearer the heart of the sources of life, than the problem of what causes rope in bread, and why moulds sometimes infest and infect baking establishments.

In the day of Haffner's vindication as "Professor of Pumpnickle," there has only happened to him what happened to Galileo when he was crushed for asserting the earth moved, and thereafter was succeeded by generations to whom this was no strange truth.

But who comes along to note in 1922 what the honorable inquisitors at last had



to note in the case of Galileo, and the honorable Board of Regents of Pennsylvania University in the case of its once-spurned dental school?

It is the Rotary Club, to be sure. Where else is a membership so alert to the wisdom of the day?

"Hurrah For Our Own D. D.," runs an editorial in the Fort Wayne "Tickler," organ of the Rotarians. "We are glad that our own George Haffner, in preaching the merits of high class baking, becomes the club's first "D. D."

And Haffner, who was once our National President, writes to the institute's general manager, a letter we feel like sharing with all bakers in our land:

"I sure have been thinking that I should visit the New Home, not because I might offer any suggestions or be of any particular help about the place, but because it really is the realization of my and our Indiana boys' dreams.

"Some sixteen years ago, our Indiana records should show, we made strong efforts to interest Purdue University in our technical school problems. \* \* \* We started the ball rolling and now we can see that our initiative efforts have finally brought fruit in the American Institute of Baking.

"After our failure, as pioneers, to establish our objects, the bakers of Wisconsin took the matter up with their State Institutions and succeeded in holding a short course at Milwaukee which I attended. I gave them information as to just what the baker needed. Paul Stern was there and will testify to the success of that event."

In the years since then, Paul Stern has built up his own "Atlas Bread Factory," and has stuck to the word "factory" as he brought in one new machine after another to take away the hand-poking at doughs. In this same town of Milwaukee

his new bakery, which is the latest word in baking research, and in the use of modern machinery for baking, is one of the points of interest of that community. And it is governed, in its chemical laboratory, by a graduate of a baking school, as great bakeries everywhere should be.

In our new home, one who will be eternally welcome, will be George Haffner, and his shade will haunt these halls long after he has gone the way of other pioneers.

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### *From An Ex-Police Commissioner*

BEFORE there were unemployed, as a post-war problem, Arthur Woods commanded the police force of New York, and made it Rule 1 of his administration that his door was always open to every single policeman with a grievance.

He made a happy police force in New York—a force happier than it has ever been before or since. In the same spirit he now finds work for unemployed as Chairman of the President's Conference on Unemployment.

And he has had time to watch the bakers and their tasks, for he writes:

"On the subject of baking I heard a talk once by Dr. Rosanoff, of the Mellon Institute in Pittsburgh, in which he told how some chemists had worked on the subject of bread baking for the war people and had produced some miraculous and uplifting changes.

"It isn't a bad thing for a fellow to contribute to taking some work off the shoulders of the mothers of the country and to making the staff of life for our babies a little purer and a little cheaper. Go to it, and whatever happens, be sure your friends will know you are busy at a great and commanding task."

# Bread In the Volga—and Here

*Some Differences as Seen by an American Observer*

By VERNON KELLOGG, Secretary National Research Council

WE Americans probably think ourselves about as clever bread makers as there are, but the war taught the people of various European countries some things about bread that we have not learned yet—and I hope never shall learn.

We have an old-fashioned notion that the principal ingredient in bread is wheat or rye or corn flour. Well, they are away ahead of us in Russia. They know how to make bread out of dried leaves and bark and moss and clay and horse dung. They are making it out of these things today, and eating it. But they don't like it.

And so America, through Mr. Hoover's relief organization, is sending over to Russia, as a free gift for the bread-makers of the Volga valley, several tens of thousands of tons of corn and wheat. I think they will be glad to come back to the old-fashioned ways of making bread out of wheat and corn flour instead of out of leaves and bark and clay.

Last October I saw thousands of Russians eating their new kind of bread, and before them, in the first year after the war, I saw thousands of Poles eating the same kind. Indeed, the war taught all of Europe new points about bread making, points, however, that they are glad to

make no further use of, and would like to forget.

One day in Lille in the days when Mr. Hoover's relief commission for occupied Belgium and North France was trying to keep the people there alive, I visited the office of the head of the local French re-

lief committee through whom our Commission worked. The Committee had sent for me to talk over bread making. They were worrying about the kind of bread they were giving out to their hungry people. They said it didn't taste good.

## *A Smell in Lille*

When I came into the office I smelled a bad smell. The chairman of the committee noticed my roving eye looking for dead rats or some-

thing similarly odorous, and promptly suggested that we would be more comfortable while we talked about bread making if he should put his bread samples outside; so he went to a window and, after raising it, picked up a black sticky mass from the inner sill and put it on the outer sill and then firmly closed the window.

In order to make our limited supplies of flour provide as much bread as possible in Belgium and France, we had the wheat

## *A Friend of the Race*

*And the Work that Makes Him  
Respect Our Bakers*

When he was a young man, and scientific students of the soil's problems were very rare, Vernon J. Kellogg wrote a book on "Common Injurious Insects in Kansas."

No wonder it was Kansas insects he wrote about, for he was born in Emporia, like "What's-the-Matter-with-Kansas" White.

In his fine friendly way Kellogg taught a generation of students at Stanford University the destructive ways of animals with plants, and the uses mankind could make of the cereals of the field.

Then came the war with its call to all friends of the human race who would see it survive. He plunged into the Hoover food relief missions and saw—in post-war service—what he here tells the bakers of America. It is a story to make our people think.



milled at a very high extraction rate and then mixed with this coarse wheat flour a considerable percentage of corn flour. The local French bakers didn't know how to make good bread out of this kind of flour. So I had to tell them how.

It can be done, as all Europe proved for itself before the war was over. Even we, over here, with the Food Administration urging us on, learned some new points about bread making.

### *From Dried Leaves to Clay*

Now, the moral of all this is, I suppose, that although bread making is one of the most ancient of arts, yet there are new things still to be learned about it. Fortunately the new things American bakers need to learn do not include making bread out of dried leaves and clay. But there are other new things. And scientific investigation will find them out. That is what the American Institute of Baking is for. And the National Research Council, which is an organization for encouraging and promoting scientific research in all fields, especially those that concern immediately the national strength and welfare of this country, wants to help the Institute in its praiseworthy effort to find a better scientific basis for a highly important art.

In the long run the arts depend on the sciences. And even in the ancient and honorable art of making bread, practiced for centuries by millions of people, there is bound to be some opportunity for advance by asking questions of science. **MANY NEW ARTS HAVE REACHED HIGH EFFECTIVENESS IN A REMARKABLY SHORT TIME BY APPEALING TO SCIENCE FOR INFORMATION** about the fundamental scientific facts on which they are founded. In bread making also there are fundamental scientific facts that cannot be ignored if

the best bread is to be produced in the most economical way. Do we know all these facts?

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### *Close-Ups on Our Home Screen*

We find Baking Technology to be a refined, high-class messenger from our industry's home. Only old General Apathy, who has been on the job so long with so many of our fellow bakers, can keep our association from growing by leaps and bounds.—E. D. Strain, Strain Baking Co., Battle Creek, Mich.

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Yours is a very fine journal and it will have a tendency to help the baker and the association.—Wm. E. Fay, President Champion Machinery Co., Joliet, Mo.

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Every article is alive and practicable and there is enough highly technical matter to make it of value to the trained chemist. If you maintain your high standard, Baking Technology will be a valuable contribution to the industry.—The Fleischmann Company, by R. E. Lee.

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I believe the journal is of great help to the baker as well as to the association. If you keep your journal free from any contamination it should be welcome as a spreader of real truth, and if it does not accomplish this purpose, in the opinion of this writer it should then be discontinued.—T. F. Naughtin, Omaha, Neb.

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It is a good publication, filling a much neglected field. Have read it with much interest.—John C. Summers, New York.

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At first I filed Baking Technology without giving it more than a cursory glance. However, after a more careful examination I think the items are extremely good and good work can be done if the baker will only read. I particularly like your

idea of strengthening the bakers' ideas as to price, for unless he can get a living profit from the sale of his goods he cannot exist.—The Mass-Keefe Co., St. Paul, Minn.

The magazine *Baking Technology* is a daisy. This is the best thing ever done for the baker.—Gordon Smith, Mobile, Ala.

It is with real interest that we read everything coming from the association and note its progress. The writer is a graduate of the Siebel Institute of Technology and is in a position to appreciate the tremendous field you work in. He can hardly wait until he can visit your new quarters to get in closer touch with your plans.—W. Zenas Smith, The Royal Bakery, Twin Falls, Idaho.

My hearty congratulations on the successful birth of a scientific journal for bakers. They need all the education we can possibly cram into them.—Edward T. Clissold, The Bakers Helper, Chicago.

We took the liberty of having our local paper publish extracts from *Baking Technology*, copies of which we enclose herewith.—The Eau Claire Baking Co., per J. P. Phillips.

### *Hearst Did It*

Probably sensationalism was never before used to such unfair purpose as in the wholesale assaults in full-page Hearst newspaper pictures of a loaf of baker's bread containing a baked mouse. The cleanest sanitary surroundings associated anywhere with food production is the answer of our modern American bakers to the insinuations of this infamous bit of newspaper exploitation.

### *Moisture Content of Flour*

THE experts of the U. S. Department of Agriculture have been studying methods of milling which are supposed to effect flour moisture products.

Bulletin 1013, on The Influence of Relative Humidity and Moisture Content of Wheat on Milling Yields and Moisture Content of Flour, by J. H. Shollenberger, discusses the results of milling tests made in an experimental mill of the Department. "No very pronounced relation between the moisture content of the flour and that of the wheat before tempering was shown," says the bulletin, "and no relation was observed between the moisture content of flour and the quantity of temper water added to the wheat.

"On the other hand, a decided tendency was shown for the moisture content of the flour to increase as the relative humidity increased, a difference of 10 per cent in relative humidity making an average difference of approximately one-half of one per cent in the moisture content of the flour."

The author qualifies these observations by the statement that "judging, however, from results obtained from other experiments, both the extent to which moisture content to the wheat is raised in tempering and the length of time of tempering have an influence on the resultant moisture content of the flour product."

These experiments are of interest to the baker chiefly because of his desire to buy flour with as low a moisture content as it is possible to make commercially.

He realizes the necessity for the use of every improved milling process in making flour and joins hands with the miller in urging that the Department of Agriculture continue its experiments until there is no difference of opinion as to the reason for the high moisture of the flours which sometimes reach the bakery.



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entry in the post-office at Chicago, Illinois, as second-class matter, applied for under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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APRIL 15, 1922.

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### *The New Co-operation*

WHEN an industry seeks to marshal its resources it cannot afford to overlook those that are spiritual merely because it gains a clearer vision of those that affect directly the materials and property of the industry's greatest leaders.

Men of the baking industry saw that the sensitive, proud and industrious housewife would never give over home baking, entirely, until she became converted to bakers' bread. She must be brought to realize, they believed, that no housewife could be more sanitary, in method, and no kitchen could be cleaner during working hours, than the baker and his plant whence came her loaf of well-wrapped bread.

The men who thought in the terms of their industry's welfare rather than merely of self, did not conclude that they "knew it all." They knew there was a new science

of sanitation and that experts of the United States Public Health Service were the proponents of this science. They knew this service had behind it the tradition of accomplishing tasks such as the sanitation of the Panama Canal Zone, of Cuba, of the army camps where Americans concentrated for the world war.

So the American Bakers Association appealed to the U. S. Public Health Service and obtained the assignment of Dr. Wm. C. Witte to co-operate with the industry, study its sanitation problems and possibilities and work out every problem he could find within the industry. Dr. Witte comes to this task well fitted for it, for he kept two great army zones free from contagion and every condition making for bad sanitation during the world war.

Through his work the American Bakers Association hopes to obtain a result which will arouse confidence on the part of every housewife, and teach to every honest inquirer the fact that science can go no further in possibilities than our bakers go in baking practice.

The coming of Dr. Witte does not mean that any baker feels he is doing less than the best of modern practice demands. It means only that the bakers have determined to self-educate their industry and will obtain an expert decision as to

whether they are at the top of their possibilities or not.

He brings with him no desire to "inspect" and "override." He will inquire and study, and give us the results for our self-education. He will build up contacts with state and municipal health inspection services. To all comers his work of co-operation will stand as evidence that the baking industry has nothing to conceal and all to reveal concerning its sanitary plants and its determined purpose to produce clean and nutritious food, made by healthy workmen out of sound raw materials.

It is a pleasure to welcome Dr. Witte, as well as his chief, Surgeon L. R. Thompson, head of the Section of Industrial Hygiene of the U. S. Public Health Service, to the baking world. When their work is through it will include every phase of the baking industry from a study of dust and humidity to a study of the most desirable types of bakery floors, walls, windows and ceilings, and the best methods of guaranteeing a healthy bakery personnel. It is a work that will count for every American home, as much as for those to whom the baking of America's bread ration has been entrusted.

The work will start at once in visits for purposes of study, to several scores of mid-western bakeries.

## *A Baker's Hope*

THE whole world knows the evil of profiteering, as every man will testify who tries to keep a roof over his head in these days of rampant tax and rent raises. But how about the other extreme of the trade pendulum swinging power?

Town after town sees price wars in which some merchant is wiped out by a competitor who deliberately sells under the cost of production to do it. Then the town learns to its regret that losing its friend and neighbor was bad business for it in the long run.

"We now look for peace and prosperity in our city," writes Gust E. Rasmussen, of Seattle. "I only hope the day will come when the man who cuts prices below cost will be liable, under the law, and before the courts of the land, to a jail sentence or a fine just the same as a man who charges too much for his goods.

"The whole trouble as I see it is a lack of understanding. If bakers would practice the word 'service' instead of thinking of 'self' always, then no trouble maker and disrupter could ever gain a foothold from which to work to destroy the baking industry. I hope for a better understanding between the mixers of vitamins and also for a stronger association and greater co-operation."



## *Who Should Come?*

FOR a long period after "rule-of-thumb" baking ceased to command the respect of bakers they faced difficulties because men who were practical bakers had no knowledge of chemistry, and chemists, for the most part, had no knowledge of practical baking.

How to get chemical knowledge and practical baking knowledge together worried many a baker.

"Are the ingredients in this dough mix all O. K.?" shouted a baker up the speaking tube to the chemist's laboratory in a large Milwaukee bakery. "The dough doesn't feel just right."

"No, I forgot to put in the salt," came the answer back.

It was a practical baker who asked the question, because watching doughs in the troughs was second nature to him. It was a scientifically trained chemist who answered back, admitting an error in which he had been fairly caught.

"I wish," said the owner of this bakery, who was one of the first to use school-trained experts, "that every student at your School of Baking be required to show three years' service in a bakery as an entry requirement. I would give such a baking school graduate promotion twice as rapidly as I can give one who comes here highly trained as a chemist but poorly trained in baking technique."

The baker who expressed this hope conducts his business from a modern office, surrounded by a competent organization. He has no personal wish to get his head or hands down into mixing troughs. He has turned business man and makes the manufacturing and selling of his bread his business. In this task he wishes his mind to become absorbed, while he hires the best experts available to handle his inside shop problems.

Bakers who have ever thought of adding school training to practical experience can well afford to note his ideal of the best type of man to trust.

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## *The Way of the Press*

HE WHO bakes bread and keeps his ear to the ground may hear much that concerns the way of life around him.

In Seattle a newspaper made a most vicious attack upon the bakers. It wanted pre-war times regardless of post-war conditions. And it wanted the bakers to prove that the war was really over, in its economic effects, as well as in its fighting.

Ten days passed after its war on the baking industry. Then suddenly the business manager of that newspaper took a hand and did something that the editor, perhaps, was little prepared for.

The business manager raised the price of the paper from 3 to 5 cents per copy. Seemingly he was finding what post-war taxes, fees, Pullman fares, transportation costs, labor costs, material costs, all mean even in an era where white paper is falling in price.

This Seattle paper could not follow white paper downward, but it volcanoed and whirl-winded its demand that the bakers follow white flour regardless of taxes, labor, transportation and material costs.

"Of course," wrote the baker who observed this other barrel of the newspaper's heavy gun in its war on bakers, "it was perfectly honorable for the paper to add 66 2-3 per cent to the retail price of its sheet, but in its eyes it was an unpardonable sin for the bakers not to reduce prices on their bread, when the price was already as low as in other cities throughout the state."

### *A Far, Far Cry*

**W**HAT could be further apart than the steps in civilization represented by an industrial ruling just made by the Appellate Court of Indiana, and the practice of members of the human family as they faced the facts on which it was based a few generations ago?

Then, when typhoid fever ran its deadly course through the land, folks blamed the good Lord and classed it with other calamities

such as hurricanes, shipwrecks and volcanic outbreaks which were beyond the power of man to control.

Now the honorable judges of the Appellate Division of Indiana class it with preventable industrial diseases. They hold that because an employe became ill with typhoid from drinking impure water furnished in his employer's factory he is entitled to compensation, just as though his finger had been taken off by an unguarded machine or he had fallen down a manhole.

What would our grandfathers have said to such a court decision?

### *A Bakers' Ordinance*

**J**. H. PHIPPS, manager of the Eau Claire bakery, found that the City Council wanted a baking ordinance. He sent here for data. His own organization responded.

"I am glad to inform you," Mr. Phipps now writes in, "that the ordinance I was instrumental in having drafted was passed, after it was explained to the councilmen. Heretofore bread has been sold at all weights, large loaves varying from 19 to 24 ounces. As our bakery was endeavoring to give full weight it placed us at a disadvantage. The new ordinance does away with this."

What Mr. Phipps did in Eau Claire you may be able to do in your town.



# The Law and the Baker

*Why Eternal Vigilance Is the Price of Sane Legislative Results*

By ELLWOOD M. RABENOLD

THE article printed below is a summary of outstanding legislation on the question of bread weights in America. When the baker considered himself a craftsman, whose problems were local and confined to his own shop, general articles of this kind had little or no appeal.

Many advised us the baker would not read them, especially the older baker. Yet, such an article informs every baker of a situation he must appraise—not in a local way, but in a National way, for Federal legislation piles up on the heels of municipal and state legislation.

The alert baker wins. In Maryland the bakers did not wake up until the lower House of the legislature had set its heart against them, passing its bill with a jeer at the industry it sought to regulate.

The bakers caught the bill in the Senate, however, and forced a public hearing. Bakers were able to tell the Senators, at this hearing, many things that legislators had not thought of, and would not be likely to think of until bakers should inform them. Then the Senators killed the bill in committee. Bakers will help to write the next one themselves.

Reading this article will be no waste of time, or mere exercise in mental activity. It may equip you to fight quickly when a legislative issue arises in your own town, your own county, or your own state. Ellwood M. Rabenold, its author, is general counsel of the American Bakers Association, and he has fought out bakers' legislative problems as no other living man has done.

—EDITOR.

## I. MASSACHUSETTS.

THE Massachusetts law, Chapter 418 of the General Acts of 1920, approved May 6, 1920, being "An Act to establish standard weights for loaves of bread," now constituting Chapter 94 of the General Laws, established the principle of permissive or alternative, rather than mandatory and exclusive standardization of bread weight in units of one pound, one and one-half pounds or multiples of one pound.

Section 7 of the law provided that "Except as provided in the following section, bread shall not be manufactured for sale, sold, or offered or exposed for sale otherwise than by weight, and shall be manufactured for sale, sold, or offered or exposed for sale only in units of one pound, one and one-half pounds, or multiples of one pound"; and then Section 8 provided that "Unit weights, as defined in the preceding section, shall not apply to rolls or to fancy bread weighing less than four ounces, nor to loaves bearing in plain position, a plain statement of the weight of the loaf and the name of the manufacturer thereof."

Under this law the baker was given the option of manufacturing and selling a standard unit

weight loaf of one pound, one and one-half pounds or any multiple of one pound, without marking, or on the other hand manufacturing and selling a loaf of bread of any other weight provided such other weight was plainly marked.

This principle after two years of trial in that State has now been definitely approved and confirmed by the Weights and Measures officials of Massachusetts. In conferences held at the beginning of this year between the officials and representatives of the baking industry, it was recognized that the Massachusetts permissive or alternative method had worked out successfully, with fairness to the public and to the industry.

The Director of Standards and the Sealers of Weights and Measures raised certain questions having to do with the enforcement of the law, and upon all these questions an agreement was reached upon the form of amendments to be made to the law. These amendments so agreed upon were presented to the Legislature in a petition of the Massachusetts Association of Sealers of Weights and Measures, and a bill prepared embodying them for passage by the General Court.

This Bill has passed the Legislature and the Governor has just approved it, thereby becoming law, constituting Chapter 212 of the General Acts of 1922.

The Massachusetts law, with these recent amendments included, now reads as follows:

"Section 7. Except as provided in the following section, bread shall not be manufactured for sale, sold, or offered or exposed for sale otherwise than by weight, and shall be manufactured for sale, sold, or offered or exposed for sale only in units of one pound, one and one-half pounds, or multiples of one pound. When multiple loaves are baked, each unit of the loaf shall conform to the weight required by this section. The weights herein specified shall mean net weights not more than twelve hours after baking, or not more than twelve hours after the sale and delivery of such loaves by the manufacturer or by his servant or agent. Such weights shall be determined by the average weight of not less than six loaves, provided, however, that such average weights shall be determined by the weight of at least twelve loaves whenever such number of loaves is available at the time and place of such weighing; and, provided, further, that bread found upon any premises occupied for the manufacture of bread for sale, or any bread found in the wagons, trucks, baskets, boxes or other delivery vehicles or receptacles owned or controlled by the manufacturer thereof, and being transported or delivered for sale, shall for the purposes of this section be deemed to have been baked within twelve hours unless such bread is marked, designated, or segregated as stale bread, under regulations prescribed by the director of standards.

Section 8. Unit weights, as defined in the preceding section, shall not apply to rolls or to fancy bread weighing less than four ounces, nor to loaves bearing in plain position a plain statement of the weight of the loaf and the name of the manufacturer thereof. Such information shall be stated in case of wrapped bread, upon the wrapper of each loaf, and in the case of unwrapped bread by means of a pan impression or other mechanical means or upon a label not larger than one by one and three-quarters inches nor smaller than one by one and one-half inches. No label, attached to an unwrapped loaf, shall be larger than provided herein, nor shall any such label be affixed in any manner or with any gum or paste which is unsanitary or unwholesome. When an inspection of bread is made at any bakery by the director or any inspector of standards or sealer of weights and measures the manufacturer of such bread or his servants or agents shall, upon request of the official making such inspection, inform him whether such bread is manufactured for sale in any of the standard unit weights prescribed by the preceding section and, if not so manufactured for sale in such standard units, shall furnish such official with samples of the labels or wrappers intended to be used on all such loaves of other than standard unit weights.

"Section 9. The director of standards shall prescribe such rules and regulations as are necessary to enforce the two preceding sections, including reasonable tolerances or variations within which all weights shall be kept; provided, that such tolerances or variations shall not exceed one ounce per pound under the standard unit or marked weight. The said director, and under his direction the local sealers of weights and measures, shall cause this section to be enforced. They may seize without warrant any bread which they may deem necessary to be used as evidence of violation of law, giving receipt therefor, and such bread shall be returned to the owner or forfeited as the court may direct. Before any prosecution is begun under this section by the Director of Standards or his agents or by any sealer or deputy sealer of weights and measures the parties concerned shall be notified and given an opportunity to be heard before the sealer and shall have the right of appeal to the director of standards, provided such appeal is filed with the

director of standards in writing within five days from the finding of the local sealer. When such appeal has been entered no prosecution shall be begun until the charges have been reviewed by the director.

"Section 10. Whoever violates any provisions of Sections two to nine, inclusive, or of any rule or regulation adopted thereunder, or whoever fails or refuses to comply with any request for information made under the authority of said Sections shall be punished by a fine of not more than one hundred dollars."

The new language in the law appears in italics above. It will be observed that all these changes are concessions by the baking industry in order to make the law more fully and more easily enforceable. They were, in fact, proposed and drafted by the baking industry to meet the questions raised by the enforcement officials.

1. The Sealers of Weights and Measures stated that it was found difficult to prove that bread had been baked not more than twelve hours. To meet this point the language was added that the Inspectors might have twelve hours after sale and delivery of the loaves within which to test weights although the bakers recognized that this might mean a spread of possibly twenty-four hours in which shrinkage of weight would occur and yet against which shrinkage they would have to guarantee full weight.

2. The point was further met by establishing a presumption that bread was fresh if found upon any premises occupied for the manufacture of bread for sale, or found in the wagons, trucks, baskets, boxes or other delivery vehicles or receptacles owned or controlled by the manufacturer thereof and being transported or delivered for sale, unless such bread should be marked, designated or segregated as stale bread.

3. The weights will now be determined by taking the average of not less than six loaves instead of twelve because the Sealer of Weights and Measures pointed out that in some cases they could not find as many as twelve loaves. On the other hand, if there are twelve loaves available the average weight of the entire twelve loaves shall be taken.

4. In order to encourage inspection in the bakery instead of in the stores and thereby cut down the period over which shrinkage might occur and against which the baker would have to safeguard weight, the language was added at the end of Section 8 as above italicized.

5. The enforcement provisions were amended so as to enable the Director of Standards or the local Sealer of Weights and Measures to seize bread as evidence and, on the other hand, the baker complained against was given not only an opportunity to be heard, but also the right of appeal to the Director of Standards with the ad-



ditional provision that no prosecution should be begun until the charges had been reviewed by the Director.

6. The last amendment in the penalty section imposes a fine on any baker who refuses to give the information which may be requested by an Inspector of Standards or a Sealer of Weights and Measures when inspection is made at the bakery as provided at the end of Section 8.

The Massachusetts law as so amended is the most advanced legislation upon the subject of bread weight. In its enactment it is expressive of the public spirited attitude taken by the baking industry toward law and its enforcement.

## II. CONNECTICUT

THE Connecticut law, Chapter 261 of the Laws of 1921, approved June 2, 1921, was drafted after the pattern of the Massachusetts law and in this form was considered at a public hearing before the Senate Judiciary Committee, at which time the Connecticut bakers appeared and expressed themselves in support of the Bill. It later appeared, however, that two important amendments were made in the Bill upon the floor of the Assembly after the Bill had come from the Senate, and as so amended the Bill repassed the Senate and became law with the approval of the Governor, to the surprise and chagrin of the Connecticut baking industry.

The Bill as so amended provided in Section 2 that "Except as hereinafter provided loaves of bread produced in any bakery procured or kept for the sale of bread, offered or exposed for sale or sold, shall be of the following state standard avoirdupois weights: one pound or one and one-half pounds or some multiple of one pound," and then in Section 3 it provided "bread produced in any bakery shall have its true weight plainly and conspicuously stated," thereby giving rise to a conflict between these two sections.

Numerous meetings were held throughout the State in the summer and fall of 1921 to determine what course should be taken. Conferences were held with the State Superintendent of Police, whose First Deputy is in charge of the Bureau of Weights and Measures. These officials declared they would not enforce the law as a mandatory and exclusive standard unit weight statute without a written opinion from the Attorney-General. The case was argued before the Attorney-General and on December 15, 1921, he rendered his formal opinion in writing advising the State Superintendent of Police "that all bread sold in this State must be marked with its true weight in accordance with the provisions of the

statute, but that loaves of bread so marked can legally be sold without complying with the standard weight."

While this matter was pending before the Attorney-General, several prosecutions were brought in the courts of West Hartford for violation of the law as a mandatory standard loaf statute, and the defendants convicted. Appeals were taken to the Superior Court, and following the Attorney-General's opinion these cases were all *nolle prosequi*.

Notwithstanding the Attorney-General's opinion, however, there are some local Sealers of Weights and Measures in Connecticut who adhere to the view that the law does compel the sale of bread exclusively in standard unit weights of one pound, one and one-half pounds or multiples of one pound, and the baking industry of Connecticut is divided between compliance with such interpretation of the local officials and adherence to the Attorney-General's opinion. It is hoped that the whole question will be set at rest by amendment to the statute at the next meeting of the Legislature in 1923.

## III. NEW YORK

IN NEW YORK there is no State statute governing the sale of bread by weight. Attempts made by successive State Superintendents of Weights and Measures to promulgate and enforce rules and regulations upon this subject have been nullified by decisions of the Court of Appeals, the highest court in the State (*People vs. Wallace*, *People vs. Wetzel* and *People vs. Gaab*, 221 N. Y. 617). Each year, however, at the request of the Weights and Measures officials, a mandatory and exclusive standard loaf bill has been introduced in the Legislature, opposed by the baking industry and defeated, until this year the baking industry determined itself to sponsor a bill which might set at rest the entire question. Such bill was drawn and very generally approved by the New York bakers, modeled after the Massachusetts law, giving the option to the baker to make a so-called standard loaf and sell it unmarked or make a loaf of other unit weight, marked. This bill was introduced at the opening of the legislative session on January 11, 1922, and came on for public hearing before the Assembly Committee on General Laws February 21, at which time the Director of Weights and Measures filed a written memorandum objecting to the bill because the alternative method would result in confusion between marked and unmarked loaves. After extended conferences an agreement was reached with the Director of Weights and Measures and this

# A Letter from Home—to You

Dear Member Baker: It has all come about so rapidly you hardly realize it, perhaps, but a traveler has just returned from the four corners of America with a tale about "our home." He saw its picture—the picture of the American Institute of Baking—hanging on bakery walls in almost every city of the land.

And he reported that it stood to nearly all bakers who saw it as a symbol. It was a symbol of a marshaled industry, with a heart and a soul and a headquarters—and a center where its common problems were assembled, and attacked to gain the greatest good for the industry.

It was an inspiring report—to us as to our duties in the "home office." But what about the baker far afield, whose support we need to feel to keep us going?

There has come to us a letter that rather burns than warms. It runs:

**"I am willing to be a good fellow and join the Association, provided the dues are not more than \$10 per year, but I don't get anything out of the membership and I won't pay the present dues."**

Now, this letter makes me wonder how many "good fellows" are members of the American Bakers Association.

How much do such "good fellow" members mean to their lodge, to their church, to the community?

Our new home needs back behind it in the industrial trenches bakers who know they are part and parcel of the most important industry in America.

We need the support of bakers who know the housewife must be convinced that she is being served by bakers whose goods are baked with a full sense of responsibility to her.

These are pioneer days with us. Our marshaling industry is just coming out of the chaos of individualism, and its members are just learning to take step together. At no time could membership mean so much to us. At no time should it mean so much as to those who are trying to carry out the vision of worlds yet to be conquered by the baking industry.

To bake bread and make its merits known so that kitchen-baking will collapse of its own sheer awkwardness by comparison with bakers' results, is our ambitious program. How can we carry it out with an indifferent membership, yielding us nothing more than "good fellow" support?

You hold the reins, you know. You can drive in any direction you wish. You have been promised much. In September you can come to our home. You will see your friend there in school. You will see your samples, if you have sent them in, going through our testing laboratories. You will see your industry's greatest problems being tackled in our research laboratories.

You will learn at first hand, how the story of bread as mankind's best food is going to the press of America, to the scientific societies, to the Home Economics teachers. You will learn how Industrial Relations matters are being tackled, how tariff matters and express rates are being handled, how we are educating ourselves in co-operation with the U. S. Public Health Service.

We want to be strong in September—to show you things fulfilled. We have dreamed and promised long enough. Don't wait till then to join. Our problems demand support RIGHT NOW of the kind of baker, who, when he subscribes to a plan, as the bakers at the last convention did, is willing to fight for its fulfillment.

Yours very truly,

H. E. BARNARD, Secretary.



# What Our Association Means

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A baker who thought he could not afford a laboratory for testing his materials, at last installed one with fear and trembling lest he had wasted his cash. Soon he found it saving him so much money that he wondered how he had ever got along without it.

No baker is so small or so remote from a big city that he can't have such a laboratory—by merely getting into contact with his association's home and its resources.

They are built for bakers. To all who wish to vision their industry's welfare, and work as a part of it, this message is written. The American Bakers Association means to its members these twenty things:

1. Participation in the most constructive work ever undertaken by any food industry.
2. Support of the best trade and technical school maintained by any industry.
3. A share in maintaining research laboratories which are lifting the bakery out of the craft class into a specialized science.
4. Co-operation in setting standards for the purity of every ingredient which the baker uses, flour, sugars, shortenings, fruits, spices, colors and flavors, and in preventing the fixing of standards of moisture, of weight, of bakery practices, which are illogically impossible to meet, of little use to the consumer and a detriment to every baker.
5. Help whenever standard weight laws, sanitary laws and all other special legislation is proposed in which you are interested.
6. Representation before Committee of Congress whenever tariffs are proposed which will increase the price of your raw materials.
7. The presentation of evidence before the Federal Trade Commission or other Government bodies which set freight rates, adjust express rates regulate the handling of shipping boxes or in any other way control your business or affects your industry.
8. Assistance in settling industrial disputes; in formulating sound economic policies; in adjusting trade controversies.
9. Participation in the work of educating the consumer to appreciate the value of bakery products, both as nutritious food and as a manufactured product which is made by expensive machinery, run by well paid labor, directed by trained men, out of the highest priced materials and

# Message to Alert Bakers

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- handled under conditions which justify every cent it costs delivered at the kitchen door.
0. The use of the Service Laboratories. Baking materials cannot be bought intelligently unless they are ordered under specifications and analyzed to show conformity to set standards.
  1. Inspection and certification of the sanitary conditions of the bakery by the inspection service being organized for the Baking Industry by the United States Public Health Service. This service has never been extended to any other food industry. It is the best possible recognition of the ambitions of the baker to regulate his industry himself and it makes unnecessary the supervision, often inadequate, now enforced by local health officials.
  2. The receipt each month of Baking Technology with its wealth of special information, both scientific and practical.
  3. Assistance in carrying on local and state association activities, both in planning conventions and in furnishing special speakers.
  14. Quick action in handling matters which promise unfavorable reactions towards the baker.
  15. Help in defending suits brought against the baker in which expert testimony is needed.
  16. A single voice speaking for the baker in his contacts with the community at large; unanimity of thought and definite action when action is necessary.
  17. The use of standardized accounting systems, prepared by the Association for the help of its members.
  18. Help in planning and putting on Eat-More-Bread and Bread-and-Milk campaigns. Publicity material, advice on advertising copy, speakers for special programs.
  19. Prompt and helpful advice on all shop problems, such as formulas, methods, machinery, materials.
  20. Unselfish and disinterested service in the splendid program the American Bakers Association is carrying out for the benefit of your industry.

These points are only the headlines of our purposes. Through them we face the future to win, just as the peach growers, the orange growers, the raisin growers, the milk producers, the wheat producers, have marshaled their industries to win.



# Your Friend and Competitor— Send In His Application Blank

**Y**OU ARE an active, right-on-your-tiptoes member. But there are half a dozen good bakers among your friends who are not members. There is only one real, honest-to-goodness reason why they are not members and that is that **THEY DON'T KNOW WHAT MEMBERSHIP MEANS TO THEM.**

Some of the things the Association is doing are told in the preceding pages. **TEAR OUT THOSE PAGES**—they are paged so you can do it without harming your copy—**AND HAND THEM TO A BAKER WHOM YOU KNOW SHOULD JOIN.**

Reinforce what we have said with your own arguments; ask him to write to us for special material, back numbers of *Baking Technology*, a photograph of our Home like the one which hangs on your office wall.

In order to help him and make your efforts the more surely successful, write his name and address on the blank below and send it in to us at once. If we can do anything which will help you to get more members in your city let us know what you want.

That is all we want. Just a chance to join hands with you. We cannot help you directly unless we hear from you directly.

## *One Thing More*

Remember we have a lot more blanks at the home office. Send us a list of bakers whom we can interest in our work. And then we'll both show them why they cannot afford to stay outside while others bending their backs to the plow in this important pioneer field, which at present is so full of stumps that need removal.

American Bakers Association, 1135 Fullerton Ave., Chicago, Ill.  
Gentlemen:

I want to know more of the work of the Association and of the conditions under which I may become a member. Will you please furnish me with the material or assistance indicated by the marked topics listed below.

1. Application Blank.
2. Pamphlet "From Beer to Bread."
3. Photograph of Association and Institute home.
4. Information about the School of Baking.
5. Information about the Research Laboratories.
6. Information about the Service Laboratories.
7. Information about the Fellowships offered by the Institute for College-trained men who wish to become bakers.
8. Information about the Registration Plan.
9. Information about the Sanitary Inspection Services.
10. Information about the Code of Ethics.
11. Information as to cost of membership, and plan of paying dues.
12. The name of a member near me with whom I may discuss Association affairs.

Name .....

Address .....

City..... State.....

agreement was approved by the Commissioner of Farms and Markets, as a result of which amendments were prepared and presented to the Legislature. These amendments struck out all reference to any standard loaf unmarked and made the bill an outright weight representation law, embodying at the same time the amendments previously agreed upon with the Massachusetts officials as relating to the Massachusetts law.

The New York amended bill reads:

"Section 193-a. Method of sale of bread. In the case of bread the weight of every loaf or other quantity sold, or offered or exposed for sale, shall be represented in one of the following ways: (a) if bread is sold, or offered or exposed for sale, in wrapped loaves, the representation of weight of such loaves shall be made by a plain statement printed upon the wrapper of each loaf in plain and conspicuous position of the net weight of the loaf and the name of the manufacturer thereof; (b) if bread is sold, or offered or exposed for sale, in unwrapped loaves, the representation of the weight of such loaves shall be made upon a label, which label or that portion representing weight shall be not larger than one by one and three-quarter inches and not smaller than one by one and one-half inches in size, affixed to the loaf in a sanitary manner, provided, however, that in the case of such unwrapped loaves sold at retail, or offered or exposed for retail sale, direct from manufacturer to consumer upon or in the premises of the manufacturer, the representation of weight of such loaves may be made upon a notice, printed in English and, if different language is spoken, also the language or languages of the neighborhood, conspicuously posted in plain view of the purchaser and in close proximity to the bread offered for sale in such premises, setting forth the weight of each size and variety of such loaves; (c) if bread is sold by the piece cut from a loaf such bread shall be weighed in the presence of the buyer upon tested scales kept for that purpose. The weights to be represented under this section shall be construed to mean net weight not more than twelve hours after baking or not more than twelve hours after sale and delivery by the manufacturer or baker for resale, the correctness of the representation of weight in the case of sale by loaf to be determined by the average weight of not less than six loaves of the same unit and manufacture, weighed within such twelve hours, provided, however, that such average weights shall be determined by the weight of at least twelve loaves whenever such number of loaves is available at the time and place of such weighing; and provided, further, that bread found upon any premises occupied for the manufacture of bread for sale, or any bread found in the wagons, trucks, baskets, boxes, or other delivery vehicles or receptacles owned or controlled by the manufacturer thereof, and being transported or delivered for sale, shall for the purposes of this section be deemed to have been baked within twelve hours unless such bread is marked, designated, or segregated as stale bread. The provisions of this section shall not apply to rolls, or to stale bread when sold as such, or to restaurant or sandwich bread sold for consumption or use on the premises and not for resale, or to fancy breads such as fruit breads, nut breads, seed-covered breads, sugar-coated breads and gluten breads and such other breads as shall be defined as fancy bread by the commissioner of farms and markets."

By the time this amended Bill came into Rules Committee of the Assembly the Legislature was about to adjourn and there was not sufficient time to effect a passage of the Bill, the Speaker recommending that the measure be presented to the next Legislature.

There is every prospect of effecting a conclusion next year, with the finest kind of co-operation between the Farms and Markets officials and the baking industry. The Director of Weights and Measures has receded from his position of insisting upon a standard weight loaf statute and is ready to join in support of legislation involving simply representation of weight.

#### IV. NEW JERSEY

NEW JERSEY has been in the same situation as to bread weight legislation as New York. There is no law upon the subject, but each year there has been a mandatory standard loaf bill introduced at the instance of the State Superintendent of Weights and Measures, Mr. Frank Wanser, who with Mr. White has served upon committees at the annual conference on weights and measures held in Washington, which in May, 1921, formally approved a model law fixing mandatory standard unit weights. This year, as before, such mandatory bill was introduced at the request of the State Superintendent of Weights and Measures and the New Jersey bakers, on the other hand, presented a model bill codifying all existing sanitary requirements affecting the baking industry and including a bread weight section in the same language as the New York bill.

Both these bills were considered in Committee of the Legislature and reported out upon the floor of the Assembly. The bakers concentrated in opposition to the mandatory standard unit weight bill introduced by Mrs. Laird (Assembly 112) and this bill was defeated.

There has been a change in the office of State Superintendent of Weights and Measures in New Jersey. With concerted effort on the part of the New Jersey bakers in 1923 a bill may be passed in the same form as the New York amended bill above set forth.

#### V. MARYLAND

IN MARYLAND also a standard loaf bill was introduced in the Legislature on January 10, 1922, known as the Grannan bill. This bill provided not only that all loaves of bread manufactured or sold should be of standard unit weights of one pound or one and one-half pounds, but also that every loaf should be marked.

The Maryland Association of the Baking Industry by a large majority determined to oppose this legislation and their opposition was successful. The Grannan bill passed the House of Delegates, but failed of passage in the Senate, being recommended to the Judiciary Committee, where it remained when the session ended on April 2nd.



# Why Bleached Flour?

*Several States Have Laws and Regulations About It, But Few Agree*

## PART II

THE conclusions of Snyder (1908), agreed in general with those of Alway (1907), and Wesener and Teller (1907), but they were in sharp disagreement with Ladd and Stallings (1906). The latter maintained that bleaching with nitrogen peroxide injured the gluten, permitted the concealing of inferior grades of flour so that they resembled the high grades and left an amount of nitrites in the bread which was probably harmful to health.

The work of Ladd and Bassett (1908), (1909), and Ladd and White (1908), was decidedly adverse to bleached flour. Ladd and Bassett concluded from artificial digestion experiments that the gluten of flours bleached with nitrogen peroxide was less digestible than from untreated flours. An antiseptic or preservative effect was noted as an effect of the bleaching agent, and the composition of the gluten was changed by the treatment. Shepard (1908), had also commented on the antiseptic effect of nitrous acid.

According to Ladd and White their alcoholic extracts of bleached flour were toxic to rabbits. During the progress of the case of the Flour Oxidizing Company,

Ltd., vs. J. and R. Hutchinson, in the Chancery Division of the High Court of Justice, England, heard in March, 1919, Dr. Ladd testified as to the toxic effect of alcoholic extracts of bleached flour. His conclusions were contradicted by Wilcox and Luff who were unable to confirm them by a repetition of Dr. Ladd's experiments.

This was also the experience of Haines and Snyder, according to the testimony given at Fargo, N.D., in the case of the Russell-Miller Milling Company, et al., vs. E. F. Ladd, 1908. Eliot (1908), commenting on Ladd's experiments on the toxicity of alcoholic extracts of bleached flour on rabbits suggested that the effect might have been due to the presence of impurities in the re-

agents and faculty technique.

Halliburton (1909), observed that flour bleached with nitrogen peroxide inhibited the normal action of the digestive enzymes.

Hale (1910), suggested that a deleterious action might result from the use of bleached flour because of the lessened degree of digestibility of the glutens and possibly because of the presence of toxic compounds in very small amounts. The

### *Our Great Bleaching Controversy*

*Like Tennyson's Brook, It Runs on Forever*

No controversy about bread making ever produced so voluminous a literature as that of bleached flour.

At this moment New York City is considering an ordinance on the subject. Laws have been passed by at least three states.

At one of the bitter law suits 2,149 pages of testimony were taken, while forty witnesses testified for the plaintiff, against forty-eight for the defendant.

To know how to handle any controversy in a baker's home territory he must know the problem's backgrounds. This article, of which a third and concluding installment will appear in the next number, gives the baker the information he requires.

presence of nitrites in the food would also have an appreciable influence on the therapeutic action of various medicinal substances when taken into the body.

Wesener and Teller (1909), stated that flour treated with such active agents as nitrogen peroxide and nitrosyl chloride did not leave deleterious substances of an antiseptic or preservative nature in the flour, but on the contrary the bleaching effects were favorable to yeast action, as "the bacteria and yeast consume the nitrite reacting material of the flour." Bleaching did not injure the gluten nor deteriorate the flavor. The amount of yeast necessary for fermentation was not increased and the loaf volume was larger with the bleached flours.

Feeding experiments were conducted with rats and no ill effects were noted from bleached flour, or bread and biscuits prepared from the flour. Similar results were obtained by feeding bread which had been made from flour treated with nitrosyl chloride. Wesener and Teller were unable to confirm the observation of Ladd and White (1908), that alcoholic extracts of bleached flour were toxic to rabbits. The diazo action on the gluten observed by Ladd and Bassett was not confirmed by Wesener and Teller, who ascribed it to faulty technique by the former.

Rockwood (1910), studied the effects of bleaching on the artificial digestion of gluten and bread. His conclusions were favorable and no difference was found in the digestibility of bread from bleached flour, as compared to that from the unbleached.

Willard and Utt (1910), reported that they found no difference in the digestibility of bleached and unbleached flours.

The Griess-Ilosvay test for the detection of bleached flour was studied by Weil (1909), Buchwald and Trembl (1909), Win-

ton and Shanley (1909), McGill (1910), Winton (1911), and Winton and Hanson (1912). This work is of much interest on the analytical side of bleaching.

### *Wanted It Labelled*

Buchwald and Neuman (1909), investigated the bleaching of flour by three electrical processes of the time, namely the Alsop, the Ozonized Company, Ltd., and the Flour Oxidizing Company, Ltd. No appreciable effects were observed on the composition and properties of the treated flours. Buchwald and Neumann stated that bleached flour should be labelled as such. This position had also been taken by the International Food Congress held in Paris, October 18-24, 1909. No injurious consequences to health from bleached flour were brought out at this congress.

Hamil (1910), gave an account of the various bleaching processes and came to the conclusion that the effects produced by a high degree of bleaching by nitrogen peroxide are not free from risk to the consumer, especially in regard to the inhibitory effect of the treatment on the digestive processes and enzymes.

Monier-Williams (1910), studied the chemical changes produced by bleaching on the flour and stated that the oil in highly bleached flours after some time undergoes considerable alteration and assumes the characteristics of an oxidized oil. About 6 or 7% of the nitrogen introduced as nitrogen peroxide is absorbed by the oil. The absorption of nitrogen peroxide by flour was not accompanied by the production of free nitrogen or diazo compounds. Bleaching was found to have an inhibitory action on the salivary digestion of flour.

Wesener and Teller (1911), criticised the work of Ladd, Halliburton, Hale and others on the physiological effects of bleached flour. Wesener and Teller ob-



served no inhibitory action from bleaching on the digestive enzymes, and stated that they were unable to demonstrate "the presence in commercially bleached flour of either mineral nitrite, nitrous or nitric acid." They also contended "that the substance which gives the nitrite reacting material" of bleached flours, "is not poisonous nor does it have any action on the blood."

### *Story Is One of Controversy*

The history of bleached flour is one of controversy, both here and abroad. In the United States the trade journals of milling and baking from about the year 1903 on, present a clear picture of the state of interested opinions from millers, bakers, food officials, promoters of processes and others which is hardly free from personalities. (Modern Miller, Operative Miller, Northwestern Miller, Bakers' Helper, Bakers' Weekly).

During this period there was also much active litigation in the courts on patent rights. In England some of the most prominent scientific investigators of the time testified in these trials. Sir William Ramsay, Sir William Crookes, Sir James Dewar, Prof. Sylvanus Thompson and Dr. Passmore are notable names in this connection. Bleached flour, like benzoic acid and saccharin, has never suffered from lack of scientific scrutiny.

As a result of the ruling against bleached flour by Dr. Ladd in North Dakota, a group of millers petitioned Judge Pollock, of Fargo, to enjoin Dr. Ladd from carrying out the provisions of Circular 1. A temporary injunction was granted, and after some delay, the case finally came to trial before Judge Pollock, who dismissed it in favor of the defendant, January 11, 1909. This was the first legal action against bleached flour in the United States, although patent litigation had oc-

cupied the attention of the courts previously to this time.

The plaintiffs claimed in general that the bleaching process improved, aged and matured the flour, that it was not injurious to health, nor affected baking quality, nutritive value or chemical composition adversely; neither did it conceal inferiority of grade. The flour was admitted to contain one part of nitrogen peroxide to the million, which was lost during baking. Testimony on behalf of the millers was given by Prof. Snyder, of the University of Minnesota, Dr. Rockwood, of the University of Iowa, Prof. Teller of Chicago, Dr. Kaiser of the Washington University of St. Louis, Dr. Haines of the Rush Medical College, Chicago, Dr. Alway of the University of Nebraska and others.

The defendant claimed in general that the products of flour bleached by nitrogen peroxide were injurious to health, detrimental to baking quality, and concealed inferior quality by simulating the appearance of high grade flour. Dr. Ladd was supported by the testimony of Prof. Shepard of South Dakota, Dr. A. L. Winton of the Chicago Laboratory and Prof. A. S. Mitchell of the St. Paul Laboratory, Bureau of Chemistry, Profs. White and Van Ess of the North Dakota Agricultural College and others.

While the decision was a legal victory for the defendant, it was not considered a defeat by the millers, as their contention that the bleaching process was not injurious to health, was sustained by the court.

The legal aspects of flour bleaching in relation to the Federal Pure Food and Drug Act became the subject of much official interest soon after its passage in 1906.

### *Dr. Wiley's View*

In September of 1907, Dr. Wiley read a paper before the State Millers' Associa-

tion at Lancaster, Pennsylvania, in which he stated that, "I hardly believe that the milling products can be improved by the introduction of a chemical of the nature of oxide of nitrogen. This is a matter on which I cannot now formulate an opinion." Dr. Wiley's remarks were severely criticised in the *Northwestern Miller* of October, 1907.

During 1908 the Bureau of Chemistry made an extensive investigation of bleached flour, and on November 18th a hearing was held on the question before Secretary Wilson and the Board of Food and Drug Inspection, at Washington, D. C., at which both proponents and opponents presented briefs and testimony. Among those heard on the side favoring artificial bleaching were Prof. Snyder, Dr. Alway, Dr. Haines, Mr. Bruce Elliott, attorney for the millers, Mr. Mitchell of the Alsop Company, and Mr. Goetzmann of the Millers' National Federation. Dr. Ladd, Dr. Winton, Mr. Mitchell of the St. Paul Laboratory, and Prof. Shepard spoke against the process.

Mr. Simon Hubig, President of the National Association of Master Bakers, expressed the opinion that bleached flour should be labelled as such for shipment in interstate commerce. This position had been taken by the Master Bakers' Association in September, 1907, through a resolution passed at their convention in Chicago. Mr. R. L. Corby, of Washington, also spoke on the side of the opponents of bleached flour.

It was estimated at this hearing that 80-85% of the milling capacity of the country was equipped to bleach flour, which involved an expense of \$3,500,000 for bleaching equipment.

The result of the hearing was unfavorable to the artificial bleaching of flour, in the opinion of the members of the Board of Food and Drug Inspection, and Secre-

tary Wilson issued F. I. D. No. 100, which stated, "that flour bleached by nitrogen peroxide is an adulterated product under the Food and Drug Act of June 30, 1906; that the character of the adulteration is such that no statement upon the label will bring bleached flour within the law, and that such flour cannot legally be made or sold in the District of Columbia or in the territories; or be transported or sold in Interstate Commerce," etc. \* \* \*

This ruling of the Secretary of Agriculture aroused intense opposition from those interested in the promotion and applications of artificial flour bleaching. The Alsop Company, for example, petitioned the Supreme Court of the District of Columbia to restrain the Secretary of Agriculture from publishing and circulating F. I. D. 100, and to compel its cancellation, but the court decided against the petitioner. (Notice of Judgment No. 498.)

In March, 1915, the Government won its case against the Aetna Mill and Elevator Company of Wellington, Kansas, at New Orleans. The flour was found to be adulterated and misbranded, and a decree of condemnation and forfeiture rendered by the court. (Notice of Judgment No. 382.) There were other seizures and proceedings against bleached flour (Notice of Judgment No. 497), but the most famous was the so-called Kansas City case which was begun in April, 1910, and not finally settled until April, 1919. (Notice of Judgment Nos. 722, 2549, 3398 and 6380).

C. B. MORISON.

(To be continued in the next issue.)

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### *About Salt*

A baker sent our laboratories samples of salt costing him \$60, \$40, and \$20 a ton. We analyzed them. The \$20 article turned out to be the best.



# From Soil to Consumer

## *The Story of Wheat as It Passes Through the Flouring Mill*

### PART II

**A**S IMPORTANT as the grinding and tearing of the teeth in the mastication of food, is the grinding and tearing that the "breaker rolls" give the berry of wheat on its way through a modern mill.

In the first article of this series we traced the wheat berry from its form as seed, through its growth in the wheat areas of the Middle West and the Far West and Canada. We are now ready to consider its journey through the mill, where it is made into flour and into various by-products of the milling process.

First of all the berry is shaken in sifters until it is separated from all bits of oats, corn and field dirt, and emerges in condition for grinding. The breaker rolls now receive it.

In the modern mill this process has become standardized until the five-break system is the most universally used. This system consists of five double stands of corrugated steel rolls.

As the wheat travels down the road from berry to flour it passes through these five pairs of rolls. Each pair of rolls has a differential speed that exerts a tearing and grinding action on the wheat. As the corrugation is different on each pair, the result on the wheat berry is different, but the progression is toward finer and finer grinding of the flour and middlings and the separation of the bran.

The wheat must be broken by the first break rolls in a way that will leave the bran in as few pieces as possible, preferably halved. If the first break rolls are so corrugated and set as to pulverize the wheat, the miller will not live up to the reputation given him by some unac-

quainted theorists, who say the miller extracts all the mineral salts from white flour, since this condition would produce a large amount of break flour, and run the percent of ash very high in all grades of flour.

If the wheat is not broken enough, it is similar to the way most people bolt their bread—mechanically realizing it to be one of the dire necessities of life sustenance.

The second, third, fourth and fifth breaks have a gradual reduction in the coarseness of corrugation, and they, too, must be very accurately set, since in this step the wheat is being ground for the separation of break flour, middlings and feeds. After each break, the stock is elevated to a bolter or sifter and separated into stocks of different granulation. All of these, after going through the reels and purifier, reach the rolls again and are again reduced.

As the stock passes over the break rolls, a portion of break flour is obtained, and this being that flour closest to the feed and outer portion of the berry, it makes up the clear grade flours. More of the clear flour comes from the reduction of the middlings. The smooth rolls follow the break rolls and are used in reducing the middling stock or that part of the berry producing the best flour.

The bran does not pass over the smooth rolls, the flour having already been scalped off. The white and brown shorts are obtained from the middling stock producing the patent flour.

The low grade or Red Dog is the poorest grade of flour, and comes from the tail

end of the mill where the feeds have their final reduction.

An attempt will be made here to explain to the bakers the difference between percent extraction and percent flour.

In obtaining the break flour or clear grade flour from that part of the wheat berry lying next to the feed, the middlings flour or patent flour from the center of the berry and the low grade flour from the reduction of both bread and middling stock a one hundred percent flour is produced. If, in producing 196 pounds of this 100 per cent flour, the miller has ground 269 pounds of wheat, he will have an extraction of 73.6 per cent. On this basis 73.6 per cent of the weight of the wheat will constitute a 100 per cent flour, the other 26.4 per cent is divided among the feeds, i. e., bran, brown middlings and white middlings.

The 100 per cent flour is divided into many different grades of flour. These grades will be made up of different percentages of the one hundred percent flour.

A 65 percent patent flour is 65 percent of the 100 percent flour made from 73.6 extraction.

The reason for the larger percent of the one hundred percent flour being a short patent or the best flour is that the starchy flour is concentrated in the center of the berry, and the number of mill streams necessary to produce the patent flour is small compared to the mill streams that produce the other thirty-five percent clear.

Usually the flour from the first, second, third and different portions of the fourth middlings flour with the first sizings stocks produce the patent flour. The remaining streams, fifth, sixth and seventh middling, first, second, third, fourth and fifth breaks, second sizings, first and second tailings, chunks, bran duster flour and

some others make up the thirty-five percent clear.

The 100 percent flour may be divided into two grades of flour, such as an 80 percent patent and a 20 percent clear, or the thirty-five percent clear may be divided in two, a 20 percent first clear and a 15 percent second clear.

The stuffed straights are made by blending a clear of any percentage with a 95 or 100 percent flour.

The 100 percent flour may make a 65 percent patent, a 30 percent clear and a five percent low grade or red dog, or the 100 percent flour may make a 95 percent flour, and a five percent low grade.

### *Laboratory's Important Role*

The laboratory plays an important role in keeping these different grades of flour uniform by analyzing for moisture, ash and protein at least twice a day. If the ash runs high the mill streams are analyzed to locate the trouble. The stream causing the trouble is followed through the mill, and it usually is found that a bolting cloth has a hole in it allowing coarse stock to pass into the flour instead of tailing over into the feed.

The analysis on three grades of flour, the 65 percent patent, 35 percent clear, and the 100 percent flour, all from the same wheat, the same mill and milled the same day, calculated to a definite moisture basis are here given:

Grade	Moisture	Protein (N x 5.7)	Ash
65% Patent	13.50	10.50	.39
35% Clear	13.50	12.00	.65
100% Straight	13.50	11.00	.48

The hydrogen ion determination of whole wheat meal extracts as well as of the flour should be a valuable factor in maintaining uniform flour.

C. J. PATTERSON.

(To be continued in the next issue.)



# The Health of Bakery Workers

*Why the U. S. Public Health Service Cooperates With Us to Guard It*

BY WILLIAM C. WITTE

*Passed Assistant Surgeon, U. S. Public Health Service*

UNTIL recently the average employer and employe have given little attention to matters of health and sanitation. On the part of the employer there seemed to be some concern lest the introduction of modernized equipment, improvement in sanitation and the raising of the standards of the employe would cripple industry, require increased wages and in general lower the morale of workers. On the part of employes the introduction of health standards and sanitary requirements was often looked upon as an encroachment on their personal liberty.

The world war has, however, altered the outlook as far as the biggest and best employers are concerned. It is being realized more and more that the health of the worker is a factor of vital importance with regard to the volume of production. It is now generally understood that in order to maintain health and produce efficiently, the worker requires conditions for work which will provide cleanly surroundings with plenty of fresh air and sufficient periods of exercise and recreation.

The employer has a definite responsibility to the worker to provide such conditions of employment, and the worker has the responsibility of providing adequate production; and above all, both employer and employe have an obligation to the consumer to produce a safe, clean and wholesome product.

It is the intent of the Inspection Service by educative measures to promote an earnest desire on the part of the em-

ployer and employe to meet this obligation.

It is necessary that certain standards of health and sanitation be established; this has been done in the Sanitary Code. It is also the intention of the Inspection Service to interpret the various sections of this Sanitary Code in relation to its application to individual bakeries and to assist employers and employes to meet them.

The Inspection Service further desires to make a study of the various health hazards of the baking industry. It has been said, for instance, that bakers are very susceptible to respiratory diseases, especially tuberculosis. It has also been said that the average baker does not live as long as an individual in a less hazardous occupation.

We want to know whether these allegations are based on fact or on statistics gathered years ago in the days of poorly ventilated cellar bakeries, long hours, intemperance and low labor standards. The Inspection Service is desirous of making studies of light and ventilation of bake shops with special reference to the health of the worker, and if feasible to set forth certain minimum requirements.

In order to accomplish this it will be necessary to have the co-operation of employer and employe alike and an understanding that the work is being done solely for the purpose of advancement along sane and practical lines, with an appreciation that sanitation is nothing more or less than the **common sense** applications of the principles of cleanliness.

### *At Our New Home*

FROM all parts of the world come visitors to the new home of the baking industry. Many of them have been about strange tasks in odd corners of the earth since last they were heard from.

Do you remember Dr. J. A. LeClerc, who "before the war" worked on flour and wheat standards for the Bureau of Chemistry of the U. S. Department of Agriculture?

As a post-war visitor he brought us word of Constantinople, Czecho-Slovakia, Denmark, Holland, Austria, and way stations. In sixteen European countries he has sought to introduce corn meal, and make smooth the path for the use of corn abroad. This for the Federal Department of Commerce.

Under the new spirit of co-operation between industry and government, Dr. LeClerc made his report not only to his bureau chiefs, but as Special Trade Commissioner he told the story of corn meal abroad to members of the American Corn Millers' Federation, at a convention in Chicago.

"Europeans are learning," he said, "that corn is not only a cheap food, but it is a good food."

Italians were saved during a famine in 1876 by large shipments of American corn. Ever since they have been the world's champion "mush" eaters, and the champion cooks of corn dishes. Their famous "polenta" is known to only a few Americans as a dish of American origin.

Dr. LeClerc found them the best propagandists in the world for the wider use abroad of American corn. And at our new home, he found research laboratories, service laboratories, and school leaders at work in a way to enthuse him over the possibilities of the broader use of wheat as America's best cereal at home.

### *A Born Walker*

THE infant, Baking Technology, was taught to walk properly immediately on birth, and if it keeps up this stride throughout its life it will accomplish much."

PAUL STERN,  
The Atlas Bread Factory,  
Milwaukee, Wis.

### *Wild Yeast*

George E. Dean, of Albion, Mich., president of the Bakery Equipment Manufacturers' Association, insists that the modern baker is responsible for the development of the modern "flapper."

O, very well, but she never got that way flipping dough for flapjacks.

The Washington housewife who was so busy baking bread that she couldn't come into the parlor to welcome President Harding was no modern woman. If she had been she would have had so many political ideas to talk over with the President that she would never have stopped to think whether her bread was burning or not.

Loud cried the little cell of yeast,  
Beneath the brewer's foam,  
"Alas, there's nowhere west nor east,  
Where safe am I at home."  
"O, come," cried Yeast of Housewife's  
Dough,  
"Long have I yearned to rove,  
"I'll leave and make you safe just so  
"Behind the kitchen stove."

"To bleach or not to bleach." That is a question that has agitated the miller for many a year. And also the miller's daughter.



## *A State Official's View of Shortening Material*

THE food inspectors are busy checking up the baker. They want to know that his plant is sanitary and that the materials he uses are pure and wholesome.

In the course of its work the Indiana Pure Food Department ran across a shortening agent made for the baker. The chemist's report on this shortening was as follows:

### APPROXIMATE COMPOSITION

Ash .....	.17%
Moisture .....	5.87%
Fat .....	7.77%
Glycerine .....	11.87%
Carbohydrates .....	74.32%

The food department was much concerned when it found glycerine in a material intended to be used in baking bread. It wanted to know why it was used. The circular accompanying the shortening said, "It is a perfect moisture-holding shortening." That is undoubtedly why the glycerine was added to it. Glycerine absorbs water while other fats release it. Evidently its makers think that the baker will be glad to find something which holds onto water, and so they offer him glycerine.

But glycerine is not a food. It is good for chapped hands, but has no place in bread.

We have to thank the food authorities for the help they are giving us in maintaining the quality of baking materials.

### *The Baker's Heritage*

THE baking industry is the most important of any, for it deals with the basic food of mankind, the staff of life. Its importance was recognized by the Savior when he breathed that prayer "Give us this day our daily bread." You men of

the industry are charged with a wonderful responsibility, in giving to the people their daily bread.

How will you treat this responsibility?

Will you be guided by selfishness and greed and do only those things which will mean personal gain for the time or will you take a broader, more patriotic stand and do those things which will advance the industry to a higher rank? Upon the leaders of today will depend the standards of tomorrow.

The great opportunity of the future is to produce a bread that will put muscle and brawn into the human race, a kind that will take away from the housewife the desire to do her own baking, and then to sell that bread for a price that will leave a fair margin of profit to the baker.

This is the great lesson that is the baker's heritage from the war that cost the world so much in human life and misery. What the bakers will do with their heritage depends entirely upon themselves. Let's decide that we will give to the world the best bread that is possible to make and ask in return that we receive a just price that will yield a fair return to us for our labor.

HERBERT L. SOMERS,

President Superior Baking Co., Fort Wayne, Ind.

### *Coming Back to Bread*

IT HAS been an economic axiom that when times are hard people eat cheaper foods. They buy poorer cuts of meat, they eat less fruit, they turn to bread and cheap vegetables. But the war upset a lot of things and even economic laws were badly bent. Last year, in spite of dull business, lowering wages, cheap corn and wheat, and bread prices approaching pre-war levels we have eaten, not more bread, but decidedly less bread than when it was

high and when unparalleled prosperity imposed no economic need for cheap food.

People may be eating more carefully than when there seemed to be no limit to the contents of the family purse, but it is to be doubted if they are actually eating fewer food units. That is, the food intake stands about level year in and year out. It is said that the German abdomen suffered a marked reduction during the lean years of the war when food was scarce and high. But even then the food actually consumed was but little less than usual. The difference lay in the fact that the German heavyweight consumed his own fat which he had been piling up as a surplus for years instead of taking it in the form of sausage and other comestibles.

The probable explanation of lessened bread consumption lies in the fact that at last we are practicing the lessons in thrift we learned so well in the meatless and wheatless days.

But there is a serious flaw in the logic which would have us eat less bread or counsel us to economize in our purchases at the bakery.

Of all the foods flour and sugar are the cheapest, the most concentrated, the least wasteful. There are no bones in a loaf of bread, there is no waste in cake or cookies. And bread and cakes, made of flour and sugar and the cheapest and best of fats, furnish far more food, with no cost to prepare or serve, than can possibly be found in any other form.

In the months ahead which we must meet with shrunken purses it would be well for our housekeepers to study carefully the relative food values of meats, fruits, preserves, the fancy groceries which cost so much more than staples and which furnish so little except variety and flavor, pastries and bread.

There is a way to meet living costs, an easy way, a wholly safe and comfortable

and satisfactory way. That way is to get back to bread and milk, back to toast as a breakfast food, back to lunches of bread and meat, bread and jam, bread and cheese, back to great piles of evenly sliced bread on the dinner table. We can double our bread consumption and be the better fed; we can cut our food bill fifty percent and still be well nourished. The answer to every wail over the cost of living, whether it is raised by social workers, by economists or by politicians is EAT MORE BREAD.

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### *Our New Hubbard Oven—and Max Henius*

IN OPENING a brand new enterprise for all the bakers of America some things happen that touch the heart.

Max Henius, master of fermentology, and teacher of thousands of brewmasters, wanted to see one loaf of bread, at least, baked in the building, now our home, where he had done his life work.

He was to leave for Europe at noon. The Hubbard Oven Company had sent us a gas-burning miniature copy of its two-deck oven. It was the first to arrive of all the baking machinery for our new school. The oven was installed in an hour, a young dough, with a heavy yeast, was forced through to baking form. At 11:40 he was handed a loaf of bread. And the presentation was made in a room where thousands of bottles had been corked—in the days before Max Henius's life work had crashed about his head. He left for Europe satisfied that a new day, indeed, had dawned.

Thus he saw the Wahl-Henius Institute of Fermentology pass and the American Institute of Baking arrive, with its initial score of one loaf baked.



## Books for the Baking Laboratory

**THE YEASTS.** By Alexandre Guilliermond. Translated and thoroughly revised in collaboration with the original author, by Fred Wilbur Tanner. XXII + 424 pp. 163 figures. John Wiley and Sons, Inc., New York, 1920.

The Institute has received many inquiries from bakers and others regarding the available books on yeasts, bacteria, molds, enzymes and fermentation, which would be helpful in the study of the biological aspects of breadmaking. Prof. Tanner's translation of Guilliermond's "Les Levures," a work well known to the specialist, is a valuable addition to the few books on yeast in English which are available to the reader.

It contains much of the accumulated data on yeasts which cannot be found elsewhere within the extent of a single volume and the bibliographical index of pages 381-409 is sufficiently comprehensive to give the student a convenient reference list to the special research work on the general subject.

The first part of the book is devoted to the morphology and development of yeasts, their cytology, physiology and classification. The student of breadmaking will find special interest in the chapters on nutrition, respiration, alcoholic fermentation, methods of cultivation, isolation and the identification of yeasts.

The second part classifies and describes the many species of yeast, with chapters on yeasts of pathogenic effects and the related fungi.

According to Prof. Tanner, "no class of micro-organisms has been more intimately associated with the progress and development of the human race than the yeasts." The baker will probably subscribe to this statement and suggest further that this intimate association is now largely confined to bakers' yeast in the United States.

At the present time there are but few general reference works in English on the subject of yeasts and fermentation of interest to the baker. Most of them are old and though fundamentally suggestive are out of date because of the rapid growth of scientific research from the viewpoint of new physical and biochemical conceptions. Others are translations of the older classics of fermentation, such as Pasteur, Hansen, Jorgensen, Klöcker, LaFarr and others. There is no single monograph which summarizes the known data on the bakers' problem of what has been

called, for lack of a better term, "panary fermentation."

The studies of Sorensen, Euler, Emberg and others on the influence of the hydrogen ion concentration on enzymatic activity are perhaps the most useful contributions of recent years in relation to the control of panary or dough fermentation. The influence of the hydrogen ion concentration on yeast and bacterial activities, as well as on other enzymes present in the flour and malt, is probably one of the many determining factors of successful dough room practice. It not only is of great importance in relation to enzyme action, but also in its effects on the physical properties of the proteins or gluten of the flour. The time is not far distant when the baker will be able to control with scientific accuracy the complex phenomena of dough fermentation.

C. B. M.

### *Abstracts of Technical Articles*

Selected for Baking Technology from  
*Chemical Abstracts*

**Vitamines of Dried Milk.** Wilh. Stepp. "Med. Klin." 17, 287-8 (1921). Highly active accessory food substances are present in dried milk powders.

**Wheat Investigations.** I. Pure lines. Jacob Zinn. "Maine Expt. Sta. Bull." 285. 48 pp. (1920). The relation of environment, composition and quality of wheat is discussed. Pure strains of Minnesota wheat were introduced into Maine for growth in the Aroostook area. The protein content of Minn. grown seed was compared with that produced after a year or more of growth in Aroostook. The bread wheats showed little change in protein content, while the Durum strains showed a marked decrease after one year's growth. Baking tests brought out marked variations in the flour strengths of the different pure lines as shown by the volume of baked loaves. The loaf volume appeared in general to be inversely proportional to the gluten content. M. S. Anderson.

**Studies of Wheat-Flour Grades.** I. Electrical conductivity of water extracts. C. H. Bailey and F. A. Collatz. "Science" 51, 374 (1920); cf. "C. A." 12, 2217. An abstract. Time and temperature of extraction affect the electrical conductivity of water extracts of wheat flour. The conductivity increases with the period of extraction, the proportional increase being greater when the extraction is conducted at lower temperatures, and also with the lower grades of flour. The relative conductivity increases as the temperature of extraction is raised above 0° until 60° is approached, when it begins to diminish. A standard procedure was adopted for comparing a number of flours containing from 0.40% to 2.38% of ash. The flour water (1:10) mixture was held at 25° for exactly 30 minutes, centrifuged, and the conductivity of the clear liquid determined by means of a dipping electrode constructed for the purpose. When examined in this manner a remarkably close parallelism was observed between the conductivity and the ash content. II. **Buffer Values of Water Extracts.** C. H. Bailey and Anna Peterson. Ibid. The H-ion concentration of water extracts of various grades of wheat flour varies between rather narrow limits. Flours with an ash content of 0.45% yielded an extract (prepared by extracting a 1:5 mixture for 60 minutes at 25°) of pH 6.1, while the extracts of flours containing from 1.2% to 1.6% of ash had a pH about 6.4. The buffer values of the extracts of these flours varied greatly, however. Thus the addition of 10 cc. of 0.02 N NaOH increased the pH of patent flour extracts 3.3 (i. e. to about 9.4) while the extract of lower grades was increased in some instances only 0.06 to 0.9 in terms of pH. The increase in pH is thus inversely proportional to the ash content, and the ratios are quite exact. The buffer value of extracts, uniformly prepared is indicative of the grade of sound flours milled from normal wheat. E. J. C.

**Our Cereals as a Source of Fats and the Significance of the Aleurone Layer to the Seed.** P. Lindner. "Jahresber. Ver. angew. Botan." 16, 29-31 (1918); "Botan. Abstracts" 7, 230-1. There is 9 times as much fat in the aleurone layer as in the germ; consequently about a million tons of fat from the grain harvest used in bread. Although cattle digest this fat, it passes unchanged through the human alimentary tract.

## Newly Granted Patents

**Drying Brewers' Yeast for Food.** J. C. Miller. U. S. 1,391,561, Sept. 20. Brewers' waste yeast is dried to obtain a flour suitable for admixture with wheat flour or for use alone as a food.

**Alcohol Recovery in Bread Baking.** J. Krizek. Brit. 168,180, June 10, 1920. The fumes from baking bread are led by a flue from the oven to a condenser and alcohol is obtained from the condensed liquid by distillation. A suitable apparatus is specified.

**Flour Improvers.** W. Watson and D. W. Kent-Jones. Brit. 168,938, May 3, 1920. A flour improver is produced by treating flour with a halogen or a compound containing available halogen. Instead of wheat flour, flour of other grain such as barley, rye, or rice, or pea, bran, or soy bean flour, or constituents of flour or substances containing them such as starch, maltose, dextrin, albumin, semolina, or tapioca, may be employed. According to one example, a quantity of flour is stirred in a closed vessel into which commercially pure Cl is led and the treatment continued until the flour contains 2-3% of its wgt. of combined Cl. It is used by adding  $\frac{1}{2}$ -1 lb. to 280 lbs. of flour or dough before baking. HCl, preferably gaseous, may be substituted for the halogen. Cf. 1661, 1901, 16938, 1913 (C. A. 9,338) and 165,149.

**Conditioning Grain, Flour, Etc.** Forget-Me-Not, Ltd., and R. Hutchinson. Brit. 164,557, March 30, 1920. The gluten strength of wheat flour is improved by subjecting the grain, stock, flour, or dough to heat and controlling the treatment by varying the pressure maintained in the chambers in which the material is treated. The treatment may consist in heating the wheat, etc., under agitation in a cylinder to such a temperature that coagulation of gluten takes place at atm. or slightly reduced pressure maintained in the cylinder by the pump. The H<sub>2</sub>O lost during treatment may be restored by damping the treated grain, or the material may be damped previously to an equiv. extent. The treatment may be employed in conjunction with treatment with phosphates, persulfates, NH<sub>4</sub> salts, NaCl, or malt extract, which may be introduced with the added H<sub>2</sub>O. The dehydrated or the finished flour may be treated with ozone, N oxides, H<sub>2</sub>O<sub>2</sub>, Cl, or nitrosyl chloride.



# What a Visitor Finds

## *On Looking Over the Growing Plant of the School of Baking of the American Institute*

A VISITING baker, while inspecting the progress of the installation of the School of the American Institute of Baking, dropped a remark which leads us to a discussion of our aim. He said, "But I do not wish to learn to be a chemist, I want to study the manufacture of bread."

Just what experiences or information this baker based his remark on we do not know. Probably he had not grasped the idea of the application of science to industry, or possibly he had had undesirable contact with schools of the past where all was theory and practical training was non-existent.

As far as instruction given to bakers is concerned, the aim of the American Institute School of Baking is to enable them to return to their job able to make a better commercial loaf of bread than when they enrolled, and to understand more fully the many and varied related matters which play such an important role in the complex industrial situation today.

To this end the equipment of the school of baking is being installed almost entirely along practical lines. Of the eleven thousand square feet of floor space available for purposes of instruction, seven thousand are given over to a practical commercial bakery, and only six hundred to a students' chemical laboratory. The remainder is used for classrooms, and for experimental baking rooms where doughs are run on a smaller scale than in the commercial shop.

The general scheme of instruction is divided into four parts. (1) The commercial manufacture of bread; (2) the experi-

mental baking of bread; (3) the study of subjects of related interest such as industrial problems concerning labor, legal matters, shop difficulties and their solution, shop records, and many other subjects; and (4) the chemistry of bread manufacture, including the methods of the manufacture and the properties of all ingredients, and the methods of testing them.

We believe in learning by doing. And so most of the student's time is spent in the shop, where he takes a personal part in the manufacture of bread under commercial conditions. In order to make this work most efficient the School bakery is equipped with three types of each machine, all connected up for use, so that a greatly varied experience can be had. A schedule of three doughs per day is to be maintained, and each dough will be carefully planned to demonstrate some principle, trouble, or condition liable to be met with in the shop. In other words the large dough in the School bakery will serve as a means of studying proper as well as improper conditions, and incidentally make it possible for the student to become more expert in the manual and machine operation.

Immediately after this practical work in the School, in which he performs the experiment with his own hands, the student will meet with the instructor in class room and laboratory, and investigate further the details of what he has just done. Under this method of work at the close of any certain run, he finds himself in possession of the facts of practical operation, and the knowledge of the why and wherefore of any particular happening.

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association*

Vol. I

CHICAGO, ILLINOIS, MAY 15th, 1922

No. 5

## A Little September Journey

NOT often in this filling-up world of ours does an individual get a chance to engage in pioneer work.

Those who attend the Twenty-fifth Annual Convention of the American Bakers Association and the Second National Exposition of the Bakery Equipment Manufacturers Association, which together with the Convention of the Retail Bakers Association meet on the Municipal Pier Chicago, during the week of September 11th, will enjoy such a privilege.

They will see the era of hand work pass and the era of machine work fully establish itself. They will see machines, the

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very existence of which they did not guess a year or two ago, in full operation.

And they will participate in a program, arranged by bakers for bakers, which will go far to win before all the world the good name for the modern loaf which is its due.

For the bakers' wives it may be well to explain that Chicago weather is ideal in September and that the Chicago parks, boulevards, bathing beaches and

the big pier will all be yours for the week. No baker needs to be a member to come and expect a welcome. The week has been planned for all who take interest and pride in the industry.



# Our School of Baking Opens

*And Thus Enables a Long Deferred Dream to Come True*

BY PETER G. PIRRIE

*Principal School of Baking of the American Institute of Baking*

AS THIS issue of Baking Technology is being distributed, the students in the pioneer course of the School of Baking are mixing doughs and meeting with their instructors. Registration day was a busy one, and those men who have notified us that they will not arrive until late, will find things moving swiftly and regularly when they come.

That our published plans meet with approval is evidenced by the fact that our 10,000 loaf bakery is being equipped by machinery consigned by the Bakery Equipment Manufacturers Association, and that the millers of the United States are supplying us with flour so that we will not have to sell bread and can run our School as a purely educational institution.

Instructors and others have been working night and day to get the School equipment in place in time. The experimental bakery is fitted up for individual work by twelve men, even to the extent of each man having his own scales. There are two three-deck Westinghouse electric ovens, with three heat controls on both top and bottom for each deck, so that the proper proportion of top and bottom heat may be obtained. In addition there is a thermostat for each deck to maintain a constant average temperature.

This room contains a fermentation cabinet with ample room for 72 doughs at one time, and a proof box which will hold 42 loaves. Both are equipped with temperature and humidity controls. Each student is running 6 doughs a day, studying the effect of ingredient and process variation,

and learning how to evaluate flour, etc. After the day's work they gather together with their instructor, discuss the experiment, and write down the results in permanent form to be carried away for future reference.

In the shop the first unit to be installed consists of a Read flour blending and sifting device, with a two barrel automatic weighing hopper and 35 gallon tempering tank; an American Oven and Machine Company's 1½ barrel high speed New Era mixer; steel and wood troughs from the Union Steel Products Co.; an American Bakers Machinery Co. two pocket divider; a Union Machinery Co. rounder; a J. H. Day Co. proofer; a Champion Machinery Co. moulder; a Peerless Bread Machine Co. Merry-go-round proofer; Union Steel proof box; Hobart Mfg. Co's small cake mixer; Dutchess Roll dough divider; Duhrkop bread oven; Roberts portable oven for bread or cake; Hubbard two deck gas fired oven; Union Steel Automatic bread cooler; Hayssen bread wrapping machine; pans from the Lockwood Manufacturing Co. and Edw. Katzinger; peels from the American peel Company; and Century large cake mixer.

## *Capacity of Plant*

This shop will run strictly on an experimental and research basis, about 1000 pounds of bread being baked each day from three doughs. This bread will be donated to Charity. Each day the students meet their instructor and discuss with him the object of the day's work and its application in the shop. They also

take up the problems of the foreman and superintendent and solve them. No student is given a certificate at the completion of a course unless he can take charge of a day's run in a satisfactory manner. Our object is to teach the manufacture of better bread, and no one will be certified until he can prove himself.

The class rooms and chemical laboratories are ready for service. The latter will be used to demonstrate the principles taught in the former. No attempt will be made to make a chemist out of a baker. Those students desiring to specialize in chemistry are handled in a special group in a separate laboratory.

Each day the entire group meets together, and listens to lecture courses by prominent men in the Industry and by members of the faculty. These subjects include Nutrition by Dr. C. B. Morison, Weight and Sanitary Laws, Standards for Bakery Materials and Products, Unfair Competition, and Science and the Baker by Dr. H. E. Barnard; First Aid to the Injured, Sanitation, Personal Hygiene, Care of Employees, and Factory Medical Supervision, by Dr. C. W. Witte; Trade Ethics, Association Work, The Woman who is unsold on Bakers' Bread, Social Relations, and Labor Disputes, by I. K. Russell, Accounting, Mathematics for Bakers, Bake Shop Mechanics, Business Law, by Mr. Pirrie, and many others.

As Julius Wilfarht said in his opening address to our students, "You are a group of earnest men come here to apply yourselves to the study of the art of making better bread. Much toil awaits you if you are to cover the schedule of work and study as laid out for you. I assure you that those who successfully complete this course will soon find themselves at the top of their profession and wish you success with all my heart".

### *England, Too, Is Hit*

AMERICA is not the only country in which sensational newspapers try to give the whole Nation a thrill of horror at the thought of some smelly beast found in the center of a loaf of bread.

England is having its share of fighting to go through.

Says the National Association Review, of London, England: "The hurt to the character of bakers caused by the recent agitation in the newspapers was due, not to the genuineness of the public grievance at the bakers' methods but to the inability of the baker to set up his defense to the public.

"If the trade had a sufficient propaganda fund of its own and would use its own distributive agencies for the education of the public the newspapers would lose their power to harm.

"The impossibility of the baker keeping the price of bread on a parity with the price of flour in a variable market will always provide the newspapers with an opportunity of decrying the baker as a profiteer, and the public, without some instruction, does not know. One of the things the matter with the baking trade in some localities is its extreme short sightedness."

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### *As Said in Passing*

It is an interesting journal for both the chemist and the baker. A. R. SASSE,  
Southwestern Milling Co., Kansas City.

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We are only getting one copy of Baking Technology and it takes too long to have the one copy passed around. Would you kindly see that we receive two? Your publication is chuck full of instructive matter.

BERNARD STERN & SONS., Milwaukee,  
By WALTER STERN, President.



# Thirty-five Years of Research

*Problems They Have Uncovered at the University of Minnesota*

BY DR. R. A. GORTNER

*Chief of the Division of Agricultural Biochemistry, University of Minnesota*

HOW many people who eat bread made from hard wheats know that the barberry blight is frightening many farmers in the Great Northwest into planting potatoes instead of wheat, and that United States Senator Kellogg is seeking to have Congress appropriate \$350,000 to fight the barberry plague while the flour millers of the country are putting up \$200,000 for the same purpose?

And how many know that the exhaustion of the first fertility of virgin soils is reducing the hard wheat area so that within another quarter of a century our bread eaters and bread bakers will face one of these alternatives:

1. They will abandon the present quality breads for the hard breads of Europe.
2. Or they will take to the hot breads of the South.
3. Or they will eradicate barberry borne rust, and save the hard wheat belt.
4. Or by research they will discover a way of converting the soft glutens of the so-called inferior wheats of to-day into the tight glutens that are so much desired for the best bread.

The problem of how to convert soft gluten into a tight gluten appears, after thirty-five years of research at the University of Minnesota, as the one outstanding problem of the field of chemical research. I have confidence that it will be solved, but whether by one investigator or a hundred and whether in one year or fifty years I cannot even predict.

The Editor of Baking Technology has asked me to sketch out for the benefit of

members of the baking industry, the work in which the University of Minnesota has been engaged since it first took up problems of cereal research.

I am glad to see the baking industry organized with a central headquarters from which matters of import to the whole industry can be broadcasted.

The engineers of America are a unit in their demands upon Congress, upon the Universities, and upon the business world which stands in need of trained engineers. The result is that you see them everywhere carrying their case successfully, whether it is in the establishing of an adequately financed College of Engineering in a university, or convincing a great industry that it needs trained men.

By the same concerted action the physicians and surgeons make out their case and gain recognition in the universities for the colleges of medicine. The dentists and pharmacists are learning to act in the same manner.

It is therefore not untimely to find the men of the baking industry seeking for the bonds with which to hold themselves together rather than for points about which to become disputatious.

We, at the University of Minnesota, are watching the baking industry grow, with keen interest of course, for its problems have been our problems, especially where they involved research.

Professor Harry Snyder pioneered the field for us. He began thirty-five years ago to work in wheat and flour chemistry. He studied weak and strong glutens and as a first move put all the stress on their chemical composition.

Almost every conceivable chemical factor was investigated and while at times it was suggested that findings were secured that bore on the problem it later developed that much of what was found out was not of universal application.

Professor Snyder resigned to become chief chemist for the Russell-Miller Milling Company. Professor R. W. Thatcher succeeded him after he had already made a reputation for himself in wheat investigation as chemist and director of the Agricultural Experiment Station at Pullman, Washington.

Working under Dr. Thatcher's direction M. J. Blish investigated the proteins of wheat flour and came to the conclusion that the proteins of strong and weak flours were identical.

When in 1916 Dr. Thatcher was made dean of the Department of Agriculture at Minnesota University he was succeeded as professor of Agricultural Biochemistry by Dr. R. A. Gortner, and Dr. Gortner in association with Prof. C. H. Bailey has continued the work.

A new view was brought into the situation and since 1916 the following problems have been studied rather extensively.

1. Colloid chemistry of the various glutens.
2. The enzymatic behavior of various flours.
3. Optimum acidity for the fermentation process.
4. The chemistry of the aging process, —what happens when flour is stored.
5. The gas retaining capacities of strong and weak glutens and the effect on baking quality of the so-called flour improvers.
6. The question of optimum conditions for yeast growth and yeast nutrients.

In the studies of flour strength we recognize three types of weakness:

1. Weakness due to an adequate quantity but an inferior quality of gluten.
2. Weakness due to an inadequate quantity of good quality gluten.
3. Weakness due to either a lack of certain enzymes or an excess of certain enzymes.

We regard this as a very decided step forward because it has enabled us to classify the weakness of a given flour and consequently gives us a hope of so amending the flour that the difficulty can be overcome.

The problem of the colloidal nature of gluten is well advanced. The first paper was published by Gortner and Doherty in the *Journal of Agricultural Research* for May 20, 1918.

The second paper was by Sharp and Gortner in the *Journal of Physical Chemistry* for February, 1922. A third paper will appear shortly in the *Journal of Physical Chemistry*.\*

There are 24 graduate students this year working in problems of agricultural research. Our physical equipment is the best in America for cereal technology work. We have a 250-barrel flour mill for purposes of instruction and research. The real problem before us is to find out how to amend poorer flours so as to give them better baking values. We have followed the course we have because it was necessary to find the cause before we could develop methods of prevention. Our work is only in its infancy. We hope it will grow as sturdily as does the baking industry itself during the next quarter of a century. Our graduates are scattered all over America and many of them are pressing forward in work of their own at research laboratories connected with other universities and agricultural colleges. We have no fear that research problems will become exhausted.

\*Papers referred to by Dr. Gortner are abstracted on page 139.



# Health and Production

*Government Research Finds Them Intimately Associated*

BY DR. WILLIAM C. WITTE

*Passed Assistant Surgeon, U. S. Public Health Service, Assigned to Survey the Baking Industry at the Request of the American Bakers Association*

WHAT do you know about the time lost from absenteeism on the part of your employes and the cause of this absenteeism? How much is this costing you each year in money and decreased production? What proportion of this absenteeism is preventable?

This is a subject of vital interest to every employer who is endeavoring to improve the health of his employes and to reduce the number of working days lost on account of sickness or injury. A few progressive firms are making a study of this matter and have obtained interesting facts, which throw light on subjects that previously have been purely speculative.

Bakery owners and managers are interested in all machines and devices which improve and increase output, increase sales and thereby build up their business. This might be termed the mechanical element of industry and is especially important. There is another and very important element, however, which should have an even stronger appeal, namely, the human element. The most modern equipment, the most up-to-date factory construction will not produce results without efficient human control. The development of the efficiency of this human control requires improved working conditions which will produce a reduction of illness and injury of employes.

No bakery owner or manager can control or prevent sickness or injury without knowing when, where and under what conditions sickness or injury actually occurs. This is essential also on account of the high insurance rates which are re-

quired unless hazards are reduced to a minimum.

The rate of absenteeism may be termed a factory health barometer. It has been said that the total time lost per employe is an index of the working conditions of any plant. From a careful survey of the records of absenteeism it should be possible to estimate the health hazards of an industry, and not only of the entire industry but of each step in the process.

Furthermore, it is in the interest of the employer to determine whether his factory has a high or low sickness rate and to know what conditions, if any, are causing ill health or injury to his employes. From the standpoint of efficient work, health of employes ranks very high. It is also a great factor in labor turnover. Ill health means large losses to employer and employe alike.

From a sickness survey conducted by a large insurance company several years ago, it was determined that the average annual loss of working time per employe was 6.9 days. It is estimated that there are approximately 200,000 bakery employes in the United States. Such rates of sickness would approximate 1,380,000 working days annually or loss from production continually of the labor of about 4,600 bakery workers. This does not take into consideration the loss from the slowing up of operations due to the absence of skilled workers, or loss due to overhead and maintenance costs which continue whether workers are present or not.

The method of securing this information varies with the conditions of the

plant; the simplest method is always the best, provided essential facts are secured.

Through cooperation with the U. S. Public Health Services, the American Institute of Baking is ready and willing to assist any baker member of the American Bakers Association in establishing a method which will provide for a careful survey and analysis of absenteeism in his plant and a determination of the health hazards present. The Public Health Service is interested in this as a matter of cooperation which it is felt will improve sanitary conditions in all bake shops and assist in eliminating health hazards from the baking industry, and from a scientific standpoint in that it will furnish data which can be analyzed for the purpose of determining indices of diseases, age group occurrence of certain diseases and effects of certain occupations on health.

The accompanying card has been devised as a personnel record card which

will serve as application blank, status card, and absenteeism record. The keeping of this record will require but little extra time on the part of the payroll or time clerk and will be entirely adequate if kept with intelligence and interest by that person. It will be noted that the card provides for repeated physical examinations of employees. This is added so that should any plant require, a record of all defects noted and whether or not they had been corrected will be available. The reverse of the card provides for absentee records and a notation should be made of all absences, whether for sickness or other causes.

It may seem to many who receive this card that it adds a burden they are unwilling to assume. But just such inquiries led the way to some of the greatest advances in industrial sanitation, and perhaps it was with this in mind that the American Bakers Association sought the survey which thus can be made.

### PERSONNEL RECORD CARD

Name.....Sex: M. F. No.....Plant.....  
 Age in 192.....Height.....Weight.....Country of Birth.....  
 Business of last Employer.....Your Position there.....How long worked there.....  
 Business of next to last Employer.....Your Position there.....How long worked there.....  
 Business of 3rd from last Employer.....Your Position there.....How long worked there.....  
 Date started (this plant).....Position.....Shift from.....M to.....M.  
 Date of leaving.....  
 (This Plant)

#### CHANGES IN POSITION IN THIS PLANT

From	To	No. of Months	Position or Occupation	From	To	No. of Months	Position or Occupation

1st Physical Ex. Defect.....Defect.....Defect.....  
 2nd Physical Ex. Defect.....Defect.....Defect.....  
 3rd Physical Ex. Defect.....Defect.....Defect.....  
 4th Physical Ex. Defect.....Defect.....Defect.....  
 5th Physical Ex. Defect.....Defect.....Defect.....  
 Dates: 1st Ex.....2nd Ex.....3rd Ex.....4th Ex.....5th Ex.....  
 Pec. 1st Ex.....2nd Ex.....3rd Ex.....4th Ex.....5th Ex.....



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entry in the post-office at Chicago, Illinois, as second-class matter, applied for under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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MAY 15, 1922.

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### *Our School Opens*

NOT out of its time does the School of Baking of the American Institute of Baking throw open its doors.

The bakers of America who visioned the needs for this school last year and backed their vision with their cash, can rest assured to-day that their work is going through to its full harvest.

The so-called educators who scoffed at George Haffner sixteen years ago because he said that bread baking was a science worthy of a university background, have no successors in the world of education to-day. They are themselves in contempt of all educated educators.

Three different universities offer their highest degrees for research to be conducted in the laboratories of the American Institute of Baking. The scientific prizes that may come from this research may stand out as new milestones in the path

of baking advance in America.

To find the better loaf of bread which can form the STAFF OF LIFE for America's millions of people is an end the worthiness of which has not been exceeded by any school or any research at any time.

The opening of our School of Baking finds a faculty devoted to its work, who look back upon the baking industry with gratitude and thanks for the splendid pioneering it has done to make this school possible.

Its pioneer classes will carry its leaven out into the whole world of baking.

Their skill will free the head of each baking plant to go out and join a Rotary club, to take a place in the community life, and to think of selling his product as intensively as he has formerly had to think of producing it.

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### *A Story We Want*

WHEN the Mayor of Savannah welcomed the bakers of the Southeast to his delightful city in April, he told them of the town's pride in Eli Whitney, inventor of the cotton gin.

Why? He told how it rescued women from the slavery of the spinning wheel.

W. S. Harwood wrote a book called "The New Earth." He celebrated in it the achievements of Gustaf De Leval and Dr. S. M.

Babcock, inventors respectively of a milk separator and a butter tester.

And why? Because, forsooth, they rescued woman from the churn. And allowed the great industry of dairying to replace the housewife's milk pans and cooling cellars.

In four months of service with this magazine the present chronicler has not heard the name of a single inventor of baking machinery.

Yet modern baking is rescuing the mothers of our race from the last of her toilsome kitchen drudgeries. Our inventors should surely rank with Elias Howe, of sewing machine fame, with Peter Cooper, of the railroads, and Fulton, of steamboats.

There will be a huge machinery exposition in September which all bakers attending their National convention can see.

Before it occurs can't we give to the world the story of the outstanding inventors of baking machinery?

Who knows the story? Old Timers who have seen the wonderful advances of the past fifteen years come into play, please answer.

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### *Health—and the Baker*

NEVER can the baking industry gain its rightful place in the public esteem until the people everywhere know that it keeps its

plants as clean as the best of household kitchens. This fact bakers have long known.

Now comes, with this same vision, the American Journal of Public Health, which reaches the best trained men and women engaged in public health service in America. It sees in the new work of the American Bakers Association a real service to current civilization.

Its editors have noted our score cards "by means of which both the bakery and the loaf can be rated in comparison with the best ideals of the industry."

This is promising. We can give this useful magazine's editors a delightful bit of new information. Our Score Card for Bakeries, drafted for us by Prof. S. C. Prescott of the Massachusetts Institute of Technology, was observed by Dr. Oscar Dowling, president of the State Board of Health of Louisiana, and was immediately adopted by him as the standard for that state.

Our "ideal score card" for loaves of bread is being constantly called into use by bakers, who send their loaves here to see how they compare to the ideal loaf. Thus they learn to serve their customers with something nearer the best loaf that can be produced in dough troughs, ovens and high- or low-speed mixers, shapers and rounders. It means that the momentum of our organization is gathering force.



### *Mr. Taggart Elected as Acting President*

THE Executive Committee of the American Bakers Association met at the association's new home, 1135 Fullerton Avenue, Chicago, on April 24th, to plan the greatest drive towards the marshaling of the resources of the American baking industry that it has ever been possible for American bakers to make.

This drive has for its object the bringing together of a larger percentage of the 32,000 bakers in America than have ever "rubbed elbows" before, at a week of daily meetings on Chicago's big Municipal Pier.

These meetings will be held during the week of September 11th. Besides planning for a larger attendance of bakers than at any past convention the Executive Committee drew up outlines for a program that will go as far as it is possible to go in setting the affairs of the baking industry before the people of America in a favorable light.

Dr. H. E. Barnard, manager of the Association, was authorized to arrange for a program of speeches by men of national reputation, and to plan meetings at the American Association's new home at which the work of the Association can be explained to all inquirers.

As a first step in making ready for the convention the Executive Committee selected A. L. Taggart of Indianapolis as Acting President. As reorganized the Committee then voted to bend all its energies until convention time in making this combined Convention and Machinery Exposition a success.

Mr. Taggart set forth in a statement addressed to the members of the baking industry his views as to the new duties thrust upon him.

"While I have always been interested

in association accomplishments," he said, "I have never been actively connected with the actual workings of the executive offices. At this time I find myself in the position of many others as I am an individual baker with a limited organization and therefore more closely tied to the details of my work than many others who have the time to devote to association affairs.

"A survey of the present situation convinces me that we are now prepared to concentrate all our efforts on our immediate tasks. Among these we find awaiting us the work of building up the American Institute and the School of the Baking and of making these activities accomplished facts before the convening of the National convention in Chicago in September.

"I have become familiar with the personnel and the activities of the American Institute of Baking and I am convinced that the work under way deserves the absolute confidence and support of the entire baking industry.

"We have all wasted too much time in the past in finding points on which to disagree and fall out. And now that in taking charge at this particular time I have 'jumped on the horse in the middle of the stream,' can't I count on the whole-hearted support of all members of the baking industry in a search for a basis on which we can all unite and work together for the common upbuilding of our industry."

### *Financial Reports*

The Treasurer and Business Manager reported upon the finances of the Association, showing that approximately \$27,000 have thus far been spent in the support of the Institute, publication of *Baking Technology*, administration and printing. The expenses of the Industrial Relations

Committee have been only \$184.09, the Public Relations Committee \$33.78, and the Sanitation Committee \$12.79.

The General Counsel to the Association reported that, pursuant to the action taken by the Board of Governors at its last meeting, the American Institute of Baking was incorporated under the laws of the State of Illinois as a membership association, not for pecuniary profit. This incorporation of the Institute as a separate legal entity was deemed advisable in order to enable the Institute as an educational body for scientific learning, to deal more effectively with its own peculiar problems. The American Institute of Baking will continue, however, to be operated under the auspices of American Bakers Association and under the control of that Association, the Board of Directors of the Institute being at all times composed of the same individuals or corporations who constitute the Board of Managers of the Association. Membership in the American Bakers Association will carry with it active voting membership in the Institute and the only way to secure active membership in the Institute will be through membership in the association.

### *A Plan for Help*

The Executive Committee of the Association recognized, however, that there are many individuals and corporations, not engaged in the baking business and therefore ineligible for membership in the American Bakers Association, who nevertheless are most keenly interested in the work of the Institute and who desire to express their interest by active support

It was the sense of the Committee that opportunity should be afforded such persons to become subscribers to the Institute, including Baking Technology at \$10.00 per year.

The Executive Committee further voted its approval that American Institute of Baking might accept support for its work from any individual or corporation, non-members of the Association, to be known as contributor.

### *New Fellowships*

Dr. Barnard outlined a plan for establishment of fellowships in research work, such fellowships to be open to college and university graduates in chemistry who desire to continue their studies with a view to entering more largely upon the problems of the baking industry. The Committee voted to establish initially two such fellowships, each with stipend of \$500.00. It is hoped that these fellowships may multiply from special funds made available to the Institute by contributions.

### *Whole Hearted Support*

The whole-hearted enthusiasm of every member of the Executive Committee in the support of this concentrated program of educational and scientific activity by American Bakers Association through the Institute and through the School of Baking, was particularly encouraging to Acting President Taggart and should be infectious with every member of the Association for greater support and larger achievement in the work of the baking industry.

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### *A Novel Dinner*

**JACK ZELLER**, a Rotarian and a baker of Shelbyville, Indiana, was asked to speak on bread before the Rotary Club of that town. He did—in his bakery at a special dinner arranged for the Rotarians there. While they ate bread was turned out right before their eyes and the excellent flavor of the world's best food permeated the whole affair.



# The Menace of Self-rising Flour

*It Ranks With Henry Ford's Synthetic Cow in Status  
as a Food Source for Humans*

SINCE man began to discover the wonders of life that are revealed to us only by the microscope and the test tube, scientists have attempted several very wicked experiments.

They are wicked not in the hopes which they aroused but only in the sad consequences of their fulfillment.

One such was an attempt of well-meaning surgeons to build up a synthetic substitute for mother's milk. They got it chemically "right" but it would not sustain the baby's life.

Another such has been the effort to make synthetic orange juice.

Chemists can get in the right amount of soluble sugars and the right amount of acids. But the juice they concoct will perform none of the wonders of the vitamin-rich juice that the orange builds within itself. If fed to folk suffering from vitamin deficiency the best preparation man can make arrests no disease while the genuine juice performs therapeutic miracles.

You can test this out for yourself in any laboratory where pigeons are fed vitamin deficient foods until they break out with polyneuritis and then are quickly cured by orange juice.

The supreme forward thrust into American life of the synthetic school of chemistry was made when some such chemists fooled Henry Ford into the idea that he could build a synthetic cow.

"It can't be done" echoed the scientific world, "because the small creatures we call wild yeasts and bacteria and the food factors we call vitamins cannot be produced by any man on earth. And they are assembled in the cow's milk and

without them it is not food,—especially without the mysterious vitamins that make the milk potent as a food for man.

Now we know you don't even need the strong potion of phosphate and the strong potion of bicarbonate of soda that are mixed in mineral form into self rising flour to make leavened dough.

You can leaven dough by merely blowing air into it.

But nobody so leavens dough. They find something missing. The resultant product is not edible bread. It won't appeal to the appetite as yeast bread will. One slice never lures you back.

We know much more than we formerly did about yeasts. They control flavors in many things.

Our good friend Max Henius, who taught brewmasters how to make brews in the building that is now the home of the American Institute of Baking, spoke of what to him stood out as the most significant thing demonstrated by his years on research into malts and malting. This was that with all his skill no man could create a yeast cell, except by feeding one yeast cell the food needed for life and growth.

And next most important in the mind of Henius was the fact that different kinds of yeasts could produce so many different kinds of flavors in beer.

And it is the same with bread and wine. These tiny plants that turn grape juice into wine, if they are of one species, go on and turn the wine into vinegar if they are of another species.

And by exactly the same process we get a fine, richly flavored bread from one species of yeast, while another strain gives us a sour and distasteful bread.

There are 90,000,000 yeast plants in a spoon full of dough. They perform a function in bread making that no substitute can perform, any more than a substitute can perform the work of a tomato in mining vitamins and minerals from the soil and rendering them useful to the human body. Or any more than a substitute for relatives of these same yeast plants can perform the splendid service for milk that turns it into a host of differently flavored cheeses.

What then shall we say for the substitutes for yeast that are put into self-rising flour to make a mechanical production of carbonic acid gas?

The first thing we must say about them is that the acids and salts used are not often correctly measured and leave a strong residue of one or the other or of new combinations made up during the reactions that give off carbon dioxide.

Calcium sulphate and sodium sulphate are salts in inorganic form. An excessive alkalinity such as is left often by the self-rising operation is a menace to good digestion in itself. It attacks the useful acids of the stomach which are essential to the digestion of protein in foods. It may produce a stomach condition of chronic alkalinity.

When the bakers of America set forth that their ideal is to make a loaf that will in very deed be "the staff of life" they do not take self-rising flour into the picture. It does not build a "bread of life." Little turnip patches through the Southland testify to the attempt of self-rising flour users to escape its consequences by the heavy use of turnip greens.

One of the splendid movements in the south is led by an Atlanta baker who turns out thousands of dozens of yeast biscuits a day to overcome the self-rising

flour habit. This baking firm sells its biscuits in wrappers each of which contains a dozen of the yeast-raised biscuits.

Another fine move is that of the U. S. Department of Agriculture which is teaching the lesson of self-rising flour through its Bureau of Home Economics. The 3,000,000,000 loaves of so-called bread baked in the south annually from self-rising flour is one of the great American challenges to the baking industry. And it is being met. In future numbers articles on this subject will outline its dangers from all angles that laboratory research and chemical knowledge have developed.

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### *An Unusual Baking Teacher*

TO ANY ONE who loves to study how the Queen Bee of a successful hive is served by so many bees who seem to be natural born honey gatherers, and others who seem to be natural born cell builders, the case of Sam Goetz ought to appeal.

For the baking industry Goetz seems to be a natural born teacher. Once Henrici's restaurant in Chicago became famous for its pastries. Few followed through to the kitchens where Sam Goetz was at work, but into every piece served went heart and service and high ideals.

Now Goetz manages a traveling school. He takes it to bakers because he knows they cannot travel to him. In the last weeks of May and the first week of June Nebraska bakers will have the privilege of attending Sam Goetz's Course.

After that the Pacific coast will have the privilege through the summer months. The men he reaches never go away dissatisfied. They know after graduating much more about making pastries serve as an insurance against home baking than they ever thought there was to learn.



### *Baker and Rotarian*

WHERE is the baker who can succeed to-day with his head down in his dough pans instead of being out in the midst of men, gauging the relationship of his bread to his community, and to life in general?

Quality bread needs a quality baker, and the quality baker is the one who knows enough to want to mix in civic affairs, in politics, in the life of his town. And to leave his dough mixes to his shop experts.

At the Savannah convention last month Southeastern bakers who arose to speak, told of Rotarian meetings and Chamber of Commerce meetings in their own towns as much as they told of their shops.

C. R. Roberts of Knoxville told of his work in that town in a way that was vibrant of the life of his whole community. Of course, then, he would make a loaf of bread to fit his hopes for his community—the best that ingredients and science could compile.

Friends of Gordon Smith came with a tale of the loving cup that his fellows in the large affairs of Mobile had presented to him.

During the convention itself Peter Nugent, a Savannah baker, invited all who wished to be his guests to a Rotarian dinner and at the dinner he taught them how to rub elbows with the liveliest men of business in the South. They were men who knew how easy it is to put up one's "neck feathers" and quarrel and how much wiser it is to "get on" together. They were men educated in service to a point where bakers will all be when they learn to seek the points on which they can work together instead of those on which they naturally tend to fall apart.

We feel that any baker who reaches out into the life of his community and be-

comes a Rotarian is on the way to reaching out into the National life of his industry and becoming a member of the American Bakers Association.

Just note this letter from J. A. Robbins of Lewiston, Montana.

I am a Rotarian and a firm believer in its principles. I have been in the baking business all my life. I have made a study of every phase of the business. I believe in it, and I believe I have a plant in Lewiston which is not excelled between Minneapolis and California.

Last year I was president of our State Organization and know something about the grief and disappointment you have along with the pleasures you also have. Anyone who has taken the interest in the baking industry you have and has accomplished the results you have, must look back upon the effort spent with considerable satisfaction.

Now I know you are wondering why I have never joined the National Association. There are several reasons . . . . But some day I am going to join and when I do I expect the Association to benefit by my membership, just as much as I expect to benefit from the Association.

What finer attitude to life than that could anyone have? Just as bodies are only the sum total of the food we have eaten, so the spirit of the National Association is only the sum total of the live interest put into it by thinking bakers.

Our magazine can only serve them when it is a real broadcasting station for the common news and common experience of the whole industry. How can it serve when bakers deliberately deafen themselves by disconnecting the contact with it?

Here is one new member we are bound to have, who will be a real member when he comes. In advance, we welcome him.

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Of six samples of flour analyzed by our research laboratories five were found to contain more moisture than the law allows. How many bakers are buying excess moisture at the price of flour?

# Obstacles to Co-operation

*Northwestern Miller Editor Tells Bakers What Ails Them, Nationally*

To all who don't feel just well in regard to National affairs in the baking industry, these words of William C. Edgar, veteran observer, and editor of the *Northwestern Miller*, have special meaning.

## GET TOGETHER

It would be a misfortune to the entire baking industry of the United States if the recent difficulties within the American Bakers Association should be permitted to weaken the trade's solidity in supporting the national organization.

The trade seems to be turning gradually back toward the old days of lack of unity, and to be diligently reviving the jealousies which the war did so much toward destroying.

The programme of activities undertaken by the American Bakers Association has an enormous potential value to the trade. It includes, through the work of the American Institute of Baking, a scientific service which no other trade or industrial organization in the country can surpass; the importance of its publicity work ought to be apparent to every baker who has ever suffered from ill-founded newspaper vituperation; in its campaign to make sanitary working conditions directly profitable to the individual baker it is serving the trade in the best possible way, by serving first of all the public.

Ninety-nine out of every hundred bakers are in no position to fight their own battles, create their own publicity or solve their own technical problems. If they are threatened with unreasonable local ordinances, they are, as a rule, powerless to plead their own cause.

How to hold all diverse interests together is the great task now confronting the American Bakers Association. The smaller bakers must be made to feel that the association has their welfare quite as much at heart as that of their formidable competitors.

It is impossible to expect the bakers to lay aside their antipathies and quarrels, or to expect all bakers, large and small, to work in complete harmony; in this one matter of supporting the American Bakers Association, however, the common welfare of the industry as a whole ought to be sufficiently important to override all the petty obstacles to co-operation.



# A News Service for Your Paper

## OLDEST QUARREL IS OVER WHITE BREAD vs. BROWN

It Divided the Guilds of Bakers  
in the Middle Ages Into  
Two Factions

When you read the words of some impassioned propagandist for white bread, who tells you that "the husk of wheat is no more fit for food than the skin of a banana is," or the word of some equally impassioned advocate of whole wheat bread who tells you white bread is the emaciator of the race don't think you are reading anything new in the way of arguments.

How does it come we have white bread? Much as it comes we have clothes.

In ancient Egypt the "poor fish" who labored went naked or mostly so. Daughters of the rich and the very rich themselves saw in clothes a way to ornament their bodies and appear "different" from the hoi-polloi. So up came the art of clothes, including ear rings, necklaces, finger rings, and drapes that proved by their quantity just how rich the owner was.

Joseph in his patches was only an imitator of the Great Rich of his day.

Just so with white bread. Laborers in the Middle Ages ate brown and black bread in Europe. The kings found that white bread could be made by using only the hearts of wheat kernels. And they must have their bread white to be different. Bakers of white bread formed different and more aristocratic guilds, and did not associate with the poor, mean bakers of brown bread.

Now kings are mostly gone but their fashion in bread has become standard for many multitudes of people.

In explaining the story of bread to a reporter of the Charlotte (N. C.) Observer General Manager Miller of the Carolina Baking Company outlined what a far, far cry it was from old fashioned methods of bread making to the present era of great machines and high-powered production.

"The first loaves of bread" he said "acted as a platter for meat slices. They were baked flat, and were often of rye or oat flour baked in a pan or in a hearth. Plates, cups, saucers, and forks, were unknown, practically. The diner received his slice of milk on his bread loaf and ate it with his fingers after carving it into suitable sized pieces. Then he took up the flat loaf which had served him as a platter and ate that too. The gravy from the meat had penetrated it and had helped to render it palatable.

"A piece of bread soaked in meat juice was a delicacy it was highly chivalrous for a Knight to offer to his lady. The bread in those days was not yeast-made, from an original yeast cake or yeast mixture, but was leavened, if at all, with sour dough kept over from a previous mix.

## DO EDITORS KNOW THE REAL DESIRES OF THEIR READERS

Baking Expert Says Not When  
They Urge Them to Stay  
in Kitchens

Not so long ago the question of whether to bake at home or buy a loaf of bread was a question of utilizing the mother's labor, in her own sanitary establishment, or the labor of some bearded immigrant who performed in the same hand-punching manner mother used, the preparation of the loaf for the oven.

But now all that has changed, and I. K. Russell, editor of Baking Technology, organ of the American Institute of Baking, takes to task those editors who still seek to tell woman her place is over the kitchen dough pan or in front of a hot baking oven.

"I have just seen your article," he wrote to an Indian editor, "concerning the savings any Indiana housewife could make if she would home-bake a barrel of flour. You put the sum, on the authority of the Cleveland Plain Dealer at \$10 per barrel and you ask 'what would the aggregate saving be in DOLLARS AND CENTS if every Indiana wife would bake throughout 1922.

"For all my self interest as an employee of the American Bakers Institute, may I intrude just a suggestion that you add up over again the same account and put in an added entry, so that you can find out the amount of back-ache a year of such work would give to Indiana mothers?

"Machines are just fighting their way into the baking industry. The most modern plant in Chicago is being rebuilt to take in the newest inventions. Fifteen years ago the same plant had no machines at all. Now no hand touches the dough of a modern loaf from mixing through to wrapping machine.

"Machines rescued father from the handcradler in the wheat field. They rescued him from the slavery of the wood pile. Machines made it possible for the editor to address his public without the interceding slavery of the hand-set printer. Why have they been slower to invade the baking field than anywhere else? Only because mother has remained the most loved and the worst paid of all laborers.

"To equip a modern bakery requires a cash outlay of from \$30,000 to \$500,000. Machines weigh ingredients to get them mixed exactly right that are so sensitive they will note the weight of a lead pencil stroke on a sheet of paper. A mixer with the strength of 1,000,000 mothers in its steel arms mixes at one batch as much dough as 200,000 women would bake up in a week of household baking. And the oven that bakes it operates at one scientifically controlled temperature, bringing out every loaf exactly alike.

"Given a baker with conscience and craft pride and he is producing a loaf the like of which the world has not known before. Yet he works al-

## DID THE BAKER MAKE FLAPPERS WHAT THEY ARE

Massachusetts Editor Brings In  
Henry Ford as a Witness  
in the Case

Did the modern bakery develop the modern flapper by freeing her from household work so that she was free to do what she pleased?

The assertion to this effect made some time ago by George E. Dean, president of the Bakery Equipment Manufacturers' Association, has gone the rounds of the American press and about every conceivable opinion has been expressed upon it.

Says the Worcester, Mass., telegram:

Henry Ford has recently been accused of bringing a curse on labor because of the way in which he has developed his automobile industry. Each employe has only one little task to perform and tires himself out doing his monotonous bit over and over, and so loses all interest in his work, is the charge.

A manufacturer of bakery equipment says the modern bakery has made the flapper possible. Girls do not have to stay home and make bread and so can devote their time to doing what they want to do.

The man who criticizes Mr. Ford thinks only of the men in the factory. The man who praises the development of the bakery thinks only of the women outside the bakery. Both fail to see the problem as a whole. Specialization is neither a curse nor an unmixed blessing. There are still only comparatively few people in the world who can do just the work they want to do.

ways in competition with a world run by men who think their women folk ought to bend their backs to dish-pan dough service, as of yore. Although the men themselves welcome the machinery that has won them personal freedom from Sir Drudge.

"The baker has had to invest knowing that a dish pan, a yeast cake and a bag of flour in any kitchen is a potential competing plant. Yet the age of machinery has come.

"Its very arrival means that women have seen that they have something better to do with their time than wear themselves out in dough punching. Doesn't its arrival mean that man cannot herd the women folks back to drudgery when once they have found new tasks of a more delightful appeal?

"The baker is not robbing the people. He too well knows the ease with which he can set up competition. His costs to-day are factory costs and flour alone cannot be the price thermometer any more than white paper can gauge newspaper production costs. It is interesting to read your article but somehow I fancy bakers will manage to struggle on, and women to win their way in fellowship with them."

Very truly,  
I. K. RUSSELL.



# The That It Is Delivered [Lift from the Staples—Tear along double line, and send to your Local Editor]

## PUBLIC IS LOSER IN BREAD WARS SAYS YORK BAKER

**He Claims the Apparent Victory  
of Cheaper Loaves Is Soon  
Overcome In Era of  
Recuperation**

Can the public win by bread wars in which the price of bread falls away below the cost of production and one baker eats another up before the price war end?

A baker says not, in a letter to the York Dispatch and he makes his point clear in a fully argued presentation of it. Under the title, "Baker Gives Warning" Jacob Hershey thus addresses the good people of his town:

Dear Editor:—Bakers would better take warning, "repent in sackcloth and ashes," and avoid the unhappy experiences of bread wars of some bakers in our western cities.

In Great Falls, Mont., several weeks ago, the bakers were engaged heart and soul in an effort to see how cheaply bread could be sold without giving it away. One large bakery sold bread for two cents a loaf; another offered nine loaves for a quarter; and still another gave away a loaf with every 25 cent purchase. Price wars of this kind are exactly like the disputes of small boys, and are generally even less reasonable. The merchants hurt themselves in trying to hurt each other.

Omaha bakers have had almost the same experience, also Kansas City, Mo. There is nothing to be gained from these foolish outbursts of greed and loss of temper. It only breeds ill will and loss of confidence among competitors, but does furnish some of the public an opportunity to laugh at the baker's childishness. The consumer loses as well as the merchant, because she does not get quality for her money, as this is invariably sacrificed to meet lower prices.

There are no advantages to be gained by trying to put others out of business. Give the public the best uniform quality of baker's products it is possible to obtain. Figure out a fair profit above your cost and get it. Avoid having to call in "disarmament conferences" to maintain peace and good will. Fellow bakers, let us not be alarmed for "in due time we shall reap if we faint not" and there will be more business for each and all of us then we will be able to handle.

Very truly yours,  
JACOB S. HERSHEY.

## STORE BILLS FALL AS BREAD BECOMES CHIEF DIET ITEM

**Authority Recommends Staff of  
Life to All who Tire of  
Other Foods**

Did you ever notice that if you eat fish you soon tire of them to a point of repugnance?

And that you get "real sore" on eggs, or poultry or beef if you keep them up for a steady diet too long?

There is only one food, authorities agree, of which the human appetite never gets tired. No one has ever been found to whom well baked yeast bread became repugnant. It offers the only food flavor of which the appetite never tires.

An editorial appearing in the Bangor, Me., Commercial tells us that not only does the grocery bill go down when a family makes bread its chief article of diet but that a loaf of bread weighing 16 ounces supplies as much energy as four pounds of chicken, or two pounds of beef, or three pints of milk.

"Faulty nutrition," continues the article, "is one of the most important factors contributing to the early degeneration of body tissues and consequent early loss of youth."

The above startling statement comes from a well-known scientific authority who goes on to say that such early degeneration causes the inaccuracy, lack of efficiency and lack of success which characterizes much of our present-day life.

He claims that "one of the most important means of preventing the deterioration of the body is through proper nutrition." And since this is true, he advocates presenting to children in practical form, the latest scientific information regarding the sort of nutrition that will "promote health and vigor, and preserve as long as possible the characteristics of youth."

Bread is by every conceivable test, the food of foods. First of all, Bread is satisfying. And it never taxes the digestion or clogs the system as do richer foods.

Most important of all, though, is the fact that Bread is so high in nutrition that alone it can be depended upon to build health, renew worn-out tissues, and guarantee energy for the day's work.

## EATING BREAD

Consumption of wheat bread is rapidly climbing back to normal, after a sharp slump that started last October. This is a sure sign of better business ahead, according to leading paper manufacturers who consider bread sales even a better barometer of general business than steel or coal output.

CAMBRIDGE JEFFERSONIAN

## SEES GREAT HOPE IN QUALITY LOAF AS STANDARD

**Director of American Institute of  
Baking Praises Press For  
Publicity About it.**

The poor baker, in many a corner of America, rises up to protest that he is picked on too much, with the way most editors "take pen in hand" to flay him because some other baker is a cent cheaper on the loaf's price, regardless of what the loaf may offer.

But they just had a quality bread contest out in Akron, Ohio, and most newspapers reported the contest, with the name of the winner. In a letter expressing his gratitude, H. E. Barnard, Director of the American Institute of Baking, set forth this view of quality bread:

"What makes the item of news about the winner of a quality loaf contest appear so hopeful to me is that editors should see the desirability of giving space to such news. Heretofore they have seemed too often to think of bread as just plain bread, and then have refused to give any other heed to it, except to demand that all bakers match the lowest price on the horizon.

"Within the past five years the making of bread as an industry has increased in America until now it is asserted that 60 per cent of all bread is baked outside of the home.

"Now by the utilization of electric trucks, express trains and large-capacity gas trucks for long hauls, the modern wholesale baker carries the drudgery-freeing product of his plant to thousands of homes in thousands of out of the way corners of the earth.

"Yet how usual is it for editors to ignore all of this modern advance, and write of women's release from bread-making drudgery as if it were begrudged to her. The editor counts up, too often, the cost of flour and salt and yeast, against the cost of a baker's loaf, and then tries to tell the woman how much she can save by baking at home. She knows better for she has to count the backache and the things undone that she had to leave to attend to her baking. She knows she has better use for her time than to spend it either at the churn or the bread pan.

"The situation on the baker's part calls for a rising to his responsibility and his opportunity. It calls for the putting out of a quality product that will make generations glad to have lived upon it. That is why quality contests count and why publication of the news of them, such as you have printed, is a fine service to our people as a whole and to our industry's standards.

H. E. BARNARD."

Chicago, Ill.



# We Can Do the Broadcasting

*But Have You the Proper RECEIVING SET?*

For the foresighted men in the baking industry to see that every quality loaf raises public esteem towards the baking industry is one thing.

For every baker who has ever been tempted by low quality substitutes to turn back to quality goods is another.

Baking Technology was established by the American Institute of Baking TO SERVE EVERY BAKER, NOT A FEW BAKERS. It was established without a single advertisement, to advocate no man's goods. Only to advocate the industry's welfare to the industry's members. AND TO TELL THEM OF EVERY DANGER SIGN ON THE HORIZON.

It is a weak voice, when it should be a strong voice, so long as it is not actually broadcasted to every possible receiving station.

Each of the 20-odd thousand bakers in America is a potential receiving station. He can become an actual one by merely subscribing now, when numbers lend confidence in these pioneer days of cooperation.

Does your shop foreman get the magazine? A full half of it is printed for him.

Do your ambitious youngsters, who look forward to a period of school get it? Much of it is printed for them.

If neither get it, and you see the point of having them, then wouldn't you like to either pass out the office copy or fill out this blank and send it in.

AMERICAN BAKERS ASSOCIATION, 1135 Fullerton Ave., Chicago, Ill.  
Gentlemen:

Please send Baking Technology to the addresses given below, and bill me for the subscriptions at the regular rate of \$5 per year.

Send to .....

Address .....

Very truly,

.....

# The Bread of Life<sup>\*</sup>

## *A Plea for Scientific Knowledge in Baking*

BY ELLWOOD M. RABENOLD

*General Counsel, American Bakers Association*

THE symbolism of bread as life giving and life-sustaining is very old. The spiritual relationship is recorded by Buddhist, Mohammedan and Hebrew prophets and disciples. The biological relationship is entablatured with the carouches of the Pharoahs in the tombs of the pyramids.

The symbolism is true today. The feeding of an entire nation of old in its forty-year journeying through the wilderness, by miraculous bread, is repeated in the salvation of millions abroad through the administration of our relief organizations, in distribution of bread-producing flour. From these unnumbered peoples, expressing human nature's primal instinct of persistence in being, their prayer for life has been a prayer for bread.

Under war conditions the Italian people derived ninety per cent of their nourishment from bread. It is estimated that sixty per cent of the French diet is bread. Great Britain with restricted meat supply increased greatly her consumption of bread during war times.

The world conflict emphasized as never before the significance of bread for sav-

ing humanity and stabilizing civilization. Several European nations in order to avoid riots subsidized the wheaten loaf and charged the loss up to the cost of the war.

This intensive need of the world for quantity under war conditions having

been somewhat relieved, the emphasis now is upon quality. And quality is judged today, not merely by wholesomeness of ingredients, or proper fermentation, or taste, but rather by nutritiveness. The test is—how far does your bread sustain human life?

This necessarily involves a study of the chemical elements composing the human organism.

"Each human body is now recognized to be a chemical factory in which the most complicated chemical

### *A Bakers Classic*

*As Seen by a Famous Editor*

It is significant that such an idealistic statement should have come from a man known primarily as a brilliant lawyer. The baking industry is now perceiving that his ability is based on a conception of the baker's function in society which gives to his industry the dignity of a profession, the exactness of a science, and the permanence of an art.

Every baker who reads it may well stop and ask himself whether he has ever had such a conception of his calling as this.

Has he ever realized his kinship to those whose function is to make life safer and richer and happier?

Has he ever thought of himself as taking a notable part in the great crusade of preventive medicine against disease?

—From an Editorial in the  
Northwestern Miller.

and physical changes are continuously taking place. When these reactions are normal from day to day, we are in good health. When they are abnormal, they are a direct cause of disease, as in gout, diabetes, goiter and other serious diseases. Moreover, when abnormal, these fundamental chemical reactions lower the natural resistance of the body, especially to invading disease germs, and they thus lead

<sup>\*</sup>Address delivered before the Southern Bakers Association, at Savannah, Georgia, April 18, 1922.



indirectly to infection, disease and death."

How far does your bread assist those normal reactions that means good health?

"Life in all its forms, be it vegetable, animal or human, is the highest expression of the transformation of matter and of energy. When we plant seeds in the fertile soil, the first stage of development consists in the transformation with the aid of water of the food, starches, proteins, fats, stored in the seed itself, into rootlets, striking down into the soil below, and into stem and stalk, striking upward to reach finally the free air above.

### *Chemists of the Soil*

From the soil the rootlets absorb water and mineral salts—potash, lime, sulphates, phosphates, nitrogen in the form of nitrates and ammonia; from the air above the growing plant absorbs and transforms with the aid of the energy of sunlight carbon dioxide, the waste products of all animal life and of our cities' furnaces.

From these simple ingredients thus taken from soil and air, the plant manufactures an infinite variety of new chemical substances, including carbohydrates (starches, sugars, gums, cellulose, wood), proteins, fats and oils, alkaloids (quinine, strychnine, morphine); dyes, and innumerable other substances. We have here in our growing plants tremendously intensive and infinitely varied chemical laboratories, on the output of which all animal life and in particular all human life is finally dependent for its very existence.

"Human life, quite obviously, is also dependent in its every instant on the chemical transformation of matter; from our inception to our return to dust, we are transforming carbohydrates, fats, proteins, salts, water; every breath we draw, every motion we make involves chemical combustion.

"The assimilation of our food, its proper utilization, its proper elimination, every single function indeed of our life is dependent on definite chemical and physical processes—relations so profound, in fact, that even the ultimate questions of life, of paramount moment to the race, are based on them, the fertilization of the seed, the enlivening of the ovum—so like the kindling of flame—the problems of heredity, of transmission of race and character from generation to generation."

### *Bread and Life*

How far does your bread, constructed from the berry of the wheat plant, contribute to these chemical and physical processes of life?

"The body demands an impressive variety of materials for its healthy sustenance. In its blind effort to contribute these, a part of humanity has been inclined to overeat, with its resultant ills of functional disturbances. Another large proportion of humanity has been well nourished in quantity but undernourished in regard to particular units of sustenance—with the resultant diseases of nourishment, beri-beri, pellagra and rickets.

"Recent work has shown that while the human body can construct a considerable number of its needs from the common ingredients of all foods, there are other vital, specific needs which must be supplied to it in finished form or else starvation of vital parts and disease and death follow in the midst of what otherwise would be plenty. It will be the duty of chemists to furnish a complete statement of such specific needs, to show just how they can be satisfied, to help out perhaps, indeed, by showing how certain rare and difficult units can be manufactured artificially.

"Indeed, co-operation between medicine and chemistry has already scored im-

portant victories in this field: Diseases such as scurvy and beri-beri have been found by physicians and chemists to have their source in the lack of certain minute but vitally important principles—hence called vitamins—found in some but not in all foods, and with these discoveries and the results of the analysis of a great variety of foods properly brought home to the practitioner the world over, these diseases should vanish from the face of the earth.”

How many of these vitally important principles does your bread contain?

These questions must be answered. Human happiness in large measure is dependent upon the way in which you answer them. The physician often strives with devotion and sacrifice to alleviate suffering, check the ravages of disease and rally the fluttering pulse, only to face defeat because of undernourishment and malnutrition in a wasted body. His answer to the questions is perforce negative, defensive. It is your privilege to make your answers affirmative, offensive.

### *Loaves of Health*

You can assist in constructing a sturdier, stronger manhood and womanhood, in proportion as you understand the chemistry of your bakeshop in relation to the chemistry of life. The bloom of your loaf may be reflected in the ruddy cheek, the alert eye and the mobile body, vivified and fortified against attack of germ and bacillus, according as you build into your loaf more and more of the chemical elements that sustain life. You will elevate civilization as you increase nourishment, for nations, like individuals, grow only if well fed.

To accomplish this you must join forces with the chemist, the physicist, the bacteriologist, the pharmacologist, the pathologist, the experimental biologist and the

medical practitioner, to make “analysis of the constituents of our body cells, of the components of the blood, of tissues, together with analysis of the components of our foods—so that we may have complete knowledge of the body in health and of what it needs to preserve its health.”

Generous Foundations are contributing millions to Johns Hopkins and to Harvard, for establishing schools of public health; and the Public Health Service of the United States Government is extending its co-operation and encouragement everywhere. It is your great privilege to join in this work, in the study and practice of preventive medicine, with a true professional spirit, setting before yourselves the common task, to accomplish “that ultimate complete mastery of science over life, which will give man and the wisdom to maintain health and increase the life span of the greatest number.”\*

### *The Greatest of Food Purveyors*

I venture to go further. This is not only your privilege; it is your very solemn responsibility. You are the greatest food purveyors to mankind. Your architects and engineers are rushing to increase your production. Your artists and litterateurs splash color and rhyme, dazzling the eye and the mind, to stimulate sales. Your ubiquitous yeast associate calls upon all to eat more bread. To what purpose? Merely that people shall gorge and stuff for your greater pecuniary profit? Not so. You are increasing your capacity for service—greater than that of any other industry, and when you invite human beings to rely more and more upon the product of your ovens to supply their life energy, you can not avoid increased re-

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\*The quotations are taken from a Report entitled “The Future Independence and Progress of American Medicine in the Age of Chemistry,” prepared by a group of scientists and published by The Chemical Foundation, Inc.



sponsibility to make that service real and constructive.

You can not content yourselves with mere mechanical production. Your product is not an end in itself. No test applied to it is sufficient excepting the test of life. In the assembling of your ingredients, in their commingling, in the fermentation and the baking, you are building chemical agencies which shall enter, harmoniously or inharmoniously as you determine, into the chemical fabric of the human body.

Would you check life? Would you stunt growth? Would you blight existence? Would you by a year, or a day, or an hour, or even by a minute, shorten the existence of any human being? You can not be sure that you avoid any of that unless you know—really know the effect of your handiwork upon human life.

On the other hand, if you can be shown that by closer attention, greater knowledge, finer perception of your processes and your raw materials, you may add to the span of life, develop the manhood and womanhood of your community, help combat disease so that all men may have life and life more abundantly—would you not do it?

### *Relationship to Science*

The baking industry has caught this vision of its relationship to science. It has established the American Institute of Baking for this very purpose; it has called men of learning and devotion in this cause; it has established relations with eminent scientists, to study foods and foodstuffs and raw materials, to weigh their value in terms of nutrition, in terms of life, and give you the benefit of their findings, their scientific researches, their chemical insight, for the betterment of your business, the enriching of your prod-

uct, the enlarging of your contribution to the public in your immediate community, and for the broadening of the permanent satisfactions of your calling. Are you supporting this Institute?

The Acting President of the national association, which is sponsoring and maintaining the Institute, is here with you. Will you not show him some visible and tangible sign that you uphold his hands? The Director of the Institute whose professional life and work and hopes and fears are bound up in it, is here with you. What heartening stimulus will you give him to carry back to his associates?

Last evening, in the verdancy of this springtime, fresh blossoms suffusing the air with an anaesthetic aroma, as shadows lengthened and birds nestled, and stars began to peep and blink in your southern skies, the world seemed very much at peace and at rest. But you and I knew that through the calm atmosphere there were waves eddying, carrying the radio music of operas, lectures of deep thought and pronouncements of political moment, all of which we could have for our edification.

So in your industry, the American Institute of Baking is today a broad-casting station, sending forth with vibrancy the scientific knowledge which shall make you truly great in the service of humanity. Will not you, each of you, set up an aerial to catch this knowledge, to enliven your business, to rejuvenate your minds, attuning your thought to the common thought which shall infuse into your handiwork more and more life-giving and life-sustaining substance and enable you to demonstrate that physical man can live by bread alone. Then you will have realized the highest goal of the baking industry. Your products will in fact be Bread of Life.

# Backward or Forward?

*North Dakota and Nebraska Bakers Ask Which Course Their Industry Steers in Interesting Neighborhood Meets*

OUT of the welter of individualism that keeps bakers apart who have so many problems on which they must all pull together, one group after another is continually pulling through to the new vision of cooperation.

In the beautiful valley of the Blue River, for instance, the going is hard for bakers in Fords on rainy days. But on a day that was both sleety and rainy Robert Teviotdale of Grand Island drove over the ridge from the Valley of the Platte to the Valley of the Blue to hold a "family party" of bakers.

Only those were invited who could conveniently drive from home to the meeting place and back the same day. "Neighborhood greetings and a little good natured elbow rubbing" was what Teviotdale set forth as the object of the meeting.

And now, just as Nebraska divides itself up into four sections for neighborhood meetings, North Dakota comes along and decides the time has passed when she can afford to be just a collection of so many isolated bakers.

Harry E. Howland of Fargo, North Dakota, called the organization meeting at Fargo and those who came voted for a Fall meeting at Minot and a winter meeting at Bismarck, or Mandan.

BAKERS REPORTED THAT FOOLISH PRICE WARS HAD BROUGHT MANY BAKERS TO THE BREAKING POINT AND THAT MANY BAKERIES WERE CLOSING WHILE SCORES OF THEM WERE UP FOR SALE.

To the bakers of America as a whole C. A. Williams addressed this message on behalf of the North Dakota bakers:

"We have found, as an industry, a place

of respect before the public within the past ten years. During that time the public has paid a price sufficient for the baker to operate under high American standards of sanitation and quality and to take his place in American public affairs. THE BAKER HAS AT LAST BEEN ABLE TO CRAWL OUT OF HIS DOUGH TROUGH LONG ENOUGH TO GET A GLIMPSE OF LIFE.

"The public has at last come to view him as a business man of their own kind and are perfectly willing to pay him enough for his product to remain worthy of a place in their esteem. HOWEVER SOME FEW BAKERS ARE STILL PRONE TO GET BACK INTO THE OLD HOLE AND DRAG ALL THE REST IN WITH THEM.

"This is the industry's gravest danger and unless some constructive influence is brought to bear we will soon find the industry back where it was ten years ago, when anybody could start a bake-shop in an alley dug-out and get away with it.

"Elusive debtors have taken advantage of the bakers' anxiety for business and have stung some of us hard. A little cooperation is necessary to taboo these shifters. 'Beware of New Accounts.' They have probably stung your competitor and want your number next."

Which only proves that in Savannah, Georgia, and Portland, Me., and Seattle and Chicago and Fargo—baking problems are measurably the same. And the way to meet them is the same—through more and more cooperation and more and more organization with a National home as its heart and working nerve center.



# Why Bleached Flour?

*A Voluminous Literature Has Been Created on the Subject*

## PART III—CONCLUSION

In April, 1910, the Government filed a libel in the United States District Court against 625 sacks of flour shipped by the Lexington Mill & Elevator Company from Lexington, Nebraska, to Castle, Missouri. The flour was seized by the United States Marshal and claimed by the Company. An amended libel was then filed by the Government which alleged adulteration and misbranding. Claims for adulteration were based on the addition of nitrites or nitrite reacting material to the flour, which reduced and lowered quality and strength, destroyed the capacity for natural aging, impaired the gluten and bread-making properties, concealed inferiority of grade, simulated the appearance of naturally aged flour and added ingredients "which may render said flour injurious to health."

Misbranding was alleged by the Government, on the grounds that the flour was not a true patent, made from hard wheat, but a mixture of middlings and an inferior grade of flour which had been bleached and milled in whole or in part from inferior wheat, namely, "yellow berry."

The Lexington Mill & Elevator Company answered the libel as then charged, and claimed that the flour was neither adulterated nor misbranded. Treatment by the Alsop process was admitted, but that the flour was injurious to health, or inferior in grade or bread-making qualities, was denied. The right of seizure by the officers of the court was disputed and the constitutionality of the Food and Drug Act attacked.

The case was tried before a jury which returned a verdict in favor of the Gov-

ernment and sustained the allegations of adulteration and misbranding. A decree of condemnation was rendered by the court on July 6, 1910. The defendants filed a petition for a new trial and appealed the case to the Circuit Court of Appeals. On January 23, 1913, the judgment of the District Court was reversed, and the case remanded for a new trial. (Notice of Judgment No. 2549.) The judgment of the Circuit Court of Appeals was finally reviewed by the Supreme Court of the United States and affirmed by Justice Day, February 24, 1914. (Notice of Judgment 3398.) The case was finally brought to a conclusion without the intervention of a second jury trial in the District Court, on April 21, 1919. About nine years had elapsed since the original libel.

On agreement between counsel and consent of the court, it was decided to eliminate the objectionable paragraph from the amended libel of May 19, 1910, which was as follows: "In that the treatment as aforesaid, the said flour has been caused to contain added poisonous, or other added deleterious ingredients, to wit: nitrites or nitrite reacting material, nitrogen peroxide, nitrous acid, nitric acid and other poisonous and deleterious substances which may render said flour injurious to health."

Counsel for the millers then withdrew all claims and defense, and the court ordered that the famous 625 sacks of flour be condemned and forfeited to the United States and utterly destroyed by the marshal. Thus ended one of the most celebrated cases in the history of food and drug legislation in this country.

The Kansas City trial lasted about six weeks, and the records of the court taken during the trial extended over 2,149 pages. Forty witnesses testified for the Government, of which sixteen were classed as experts, and forty-eight for the millers, including thirteen experts. Notice of Judgment No. 722 contains 100 pages of text, and presents an abstract of the important testimony taken during the trial. Prof. Shepard, Drs. Winton, Mitchell, Kempster, Jones, Mann, Marshall, Hullett, Acree, Stengel, Folin, Boos, Child and Sloan were among the experts for the Government; and for the millers, Drs. Wesener, Sayre, Teller, Emerson, Albert, Rockwood, Willard, Alway, Webster, Haines, and Schweitzer.

In addition to the scientific experts a number of practical millers and bakers were heard, so that the evidence recorded in the Kansas City case presents very probably a fairly close approximation of the opinions of those for and against bleached flour at this time.

While the disposition of the bleached flour cases was pending, Service and Regulatory Announcement No. 15, Nov. 4, 1915, Par. 154, was issued by the Department of Agriculture, which gave notice that irrespective of the question whether flour bleached with nitrogen peroxide is adulterated or misbranded in any of the particulars charged in the pending cases, it is misbranded if labelled "electrically bleached."

### *The Latest Ruling*

At the present time the last ruling of the Department of Agriculture is that of Service and Regulatory Announcement No. 26, Par. 350, issued December 30, 1920, which is as follows: "Flour bleached by any process is regarded by the bureau as adulterated if the bleaching has reduced

the quality and strength of the article, or has concealed damage or inferiority. Bleached flour may be shipped within the jurisdiction of the Food and Drugs Act only on condition that the bleaching has not impaired the quality or strength of the article or concealed damage or inferiority, and then only if branded plainly to indicate that it has undergone a process of bleaching.

Failure to label the containers to show that such flour has been bleached will subject it to a charge of misbranding. The United States Supreme Court has ruled, with reference to the section of the act relating to the addition of a poisonous or deleterious ingredient, that to constitute adulteration an article of food must, by the addition of an ingredient, be rendered injurious to health, and furthermore, that all the circumstances must be examined to determine whether the article of food has been rendered injurious. No action will be taken at the present time on the ground that bleaching introduces into the flour a substance which may be injurious to health, provided as a result of bleaching there is not introduced such a quantity of the bleaching agent as may render the flour injurious as indicated in the decision of the Supreme Court.

Should evidence later become available that the bleaching of flour introduces an ingredient in minute quantities which has the effect of rendering the article injurious to health, announcement of the fact will be made and appropriate action will be taken to prevent thereafter the shipment of bleached flour within the jurisdiction of the Food and Drugs Act. Whether bleaching in any given shipment reduces the quality and strength of the flour or conceals damage or inferiority must be decided on the basis of the facts in each particular case. This ruling supersedes Food Inspection Decision 100, and



is issued with the approval of the Secretary of Agriculture."

Some of the states and cities have laws and regulations regarding bleached flour, such as Wisconsin, which prohibits the sale of flour bleached by any process. North Dakota prohibits by law flour bleached with nitrogen peroxide, and by regulation bleaching with other agents. California and Georgia prohibit bleached flour by regulation (1916). The City of Cleveland (Sanitary Code of 1920), prohibits the sale of bleached flour. There is no uniformity in the state laws, rules and regulations relating to bleached flour at the present time.

The literature on bleached flour which has been cited here is for the most part, concerned with the effects of nitrogen peroxide and but slight reference has been made to the use of other reagents, such as the halogens and their compounds. This is due to the fact that when methods for bleaching flour were first introduced into the mills they were mainly based on processes which produced oxides of nitrogen by electrical or other means. The commercial use of chlorine and its compounds appeared later and when first suggested received but little recognition from the chemist as a treatment of practical significance.

It will be recalled that Alway, Snyder and other early authorities were not favorably impressed with the halogens as bleaching agents for flour. The high chemical activity of the gas and the difficulty of properly controlling its addition to the flour militated strongly against its successful use. At the present time chlorine and its compounds have an extensive application in flour bleaching processes. This has been largely brought about by the development of improved apparatus for regulating and controlling the amount of gas which may be added to the flour,

as well as to a better knowledge of its effects. Nitrosyl chloride as a bleaching agent for flour became the subject of American and foreign patents in 1907. The late Sir William Ramsay, a physical chemist of note, was granted patents for this compound in that year. In the United States, Dr. J. A. Wesener and associates of Chicago developed the applications of nitrosyl chloride and chlorine in a series of patents which with later modifications are now the basis of the process of the Industrial Appliance Company of Chicago.

Recently other treatments have been developed such as the Agene process of the Wallace and Tiernan Company, which is claimed by its inventor, Dr. J. H. Baker, to be based on the application of nitrogen trichloride as the active agent. Dr. Baker has also patented the use of gaseous hypochlorous acid.

The patent of Fegan and Sasse (U. S. No. 1,330,937) employs gaseous chlorine and ammonia in their treatment of flour.

It has been previously mentioned that there is but slight reference in the literature to the specific effects of chlorine bleached flours from chemical or physiological standpoints.

C. A. A. Utt (1914) has published the results of an examination of chlorine bleached flours which states that "the chlorine content of untreated flour may run as high as 576 parts per million. Chlorine treated flour will contain over 600 parts per million."

The Association of Official Agricultural Chemists engaged in a cooperative study of methods for the determination of chlorine in bleached flours which is still in progress. LeClere (1920). Rask in his report of 1921 to this Association as Associate Referee on Cereal Foods has found that the fat of the unbleached flour used in the cooperative work contained 30 parts of chlorine per million of flour. The

same flour bleached by the ordinary amount of chlorine yielded a fat which contained 100 parts of chlorine per million of flour. Bailey and Johnson (1922) have studied the effect of chlorine bleaching upon the electrolytic resistance and hydrogen ion concentration of water extracts of flour. They found that bleaching flour with chlorine increases the specific electrical conductivity, hydrogen ion concentration, and buffer action of flour extracts in direct ratio to the quantity of chlorine used. These differences apparently do not disappear on storing the flour for some months.

Lately a new process of flour treatment has been exploited in the United States which is known as the Novadel process. According to the claims of its promoters the Novadel process consists in a chemical treatment of the middlings by the addition of a highly active organic peroxide during the milling process. The basic U. S. patent is 1,380,334 with detail and improvement patents pending.

The development of new processes for the treatment of flour is still in an active state of investigation. The question of the merits of the natural aging of flour versus bleaching and conditioning by artificial processes in its relation to bread making will probably remain as it has been in the past, a subject of bitter controversy until more is definitely known of the factors which determine flour strength. The physiological side of the problem has not been the subject of extensive investigation in the light of the new knowledge of nutrition, and this too will probably remain in the field of controversy until scientific opinion is more in accord.

C. B. MORISON.

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## *Are Our Problems National?*

THE hardest nut for the bakers to crack who are trying to get their fellows to see baking problems as National problems, and each poor loaf of bread as an enemy of the whole baking industry, lies in the zones where bakers won't look beyond their shops.

But are baking problems national? Into the new home of the American baking industry, three men of England came as visitors. They went into our service laboratories where they saw six test tubes standing fuller with water drawn from flour samples than the law allowed.

"Just like England" they exclaimed. "There, too, flour that is too moist is stopping us from buying by brand name. We, too, need laboratory control like this, and we shall have it."

The visitors went through our library where they saw heaps of newspaper clippings piled full of abuse of the bakers.

"We had the same abuse to stand for over there" the visitors exclaimed again, and they added, as they noted the mass of material that had been fired out into the dough mix of assault to leaven it and change the hearts of its writers, "What we need in England is a central office like this with funds to make the central office a fighting center for our industry."

They went through the rooms dedicated to the teaching of youth in the art of bread making.

"We have a school in Manchester," they said, "and it is operated by the Master Baker Association. But it needs your thoroughness. Here you set up a defense for the industry against deterioration of personnel as machines come into more general use.

They saw shortenings, sugar, milk, all going into dough mixes. "Perhaps we should use them," they said. "But they

pound us on price until we give them yeast and flour alone with just a pinch of salt. And we give them no wraps. Perhaps we should."

These three visitors from abroad were William and George Warburton, of the Back-o'-th'-Bank Model Bakery, Bolton, and J. Arthur Butterworth, of Littleborough.

Before coming to the American baking industry's National home they found something of the most acute interest to them in each of the bakeries they visited in New York, Philadelphia, Baltimore, Washington, and Pittsburgh. And they expected to find other things just as timely to watch for English bakers' use, in bakeries they still were scheduled to visit in Minneapolis, Winnipeg, Toronto, Niagara, Buffalo, Montreal, Boston and New York.

We have their promise that when the good ship on which they are to sail from New York bears them back home next month they will spend two days at sea setting down for readers of *Baking Technology*, their outstanding final impressions of our land. They agreed with us that the bakers of each nation can go to school to the other—and find their problems are almost wholly the same.

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## *A Fine Message*

PLEASE let me know what we can do towards getting attendance at the Chicago meeting, in September.

We want you to know that the Southern Bakers are behind you to the fullest limit and that we will do all in our power to help you win out.

Yours for a smashing big convention,  
The Southeastern Bakers Association,

By Gordon Smith,

The question is one for Every Baker and His Wife. Will they be here?



## Books for the Baking Laboratory

**THE VITAMINES.** By Casimer Funk. Authorized translation from the second German Edition, by Harry E. Dubin. 502 pp. Williams and Wilkins Co., Baltimore, 1922.

**THE VITAMINS.** By H. C. Sherman and S. L. Smith. American Chemical Society Monograph Series. 260 pp. The Chemical Catalog Co. Inc., New York, 1922.

**STUDIES IN DEFICIENCY DISEASE.** By Robert McCarrison. Oxford Medical Publications. Henry Frowde and Hodder and Stoughton. London, 1921.

Inquiring bakers and others who are anxious to obtain first hand information about the vitamins or vitamins will find it in these three recent volumes. The publication of authoritative summaries of what has been done in the field of vitamin research is especially welcome and timely. Probably no physiological subject has so rapidly captured the popular imagination as the vitamin aspects of nutrition, but unfortunately its presentation to the nontechnical reading public has not always been free from food prejudices, misstatements, loose generalizations, half truths and erroneous conclusions. The conception of substances as potent as the vitamins lends itself readily to sensational exploitation, and it is not surprising that much of the popular writing on the subject partakes of this character.

A fitting antidote is now easily available in a book like Funk, or Sherman and Smith, which while accurate and technical are still readable and comprehensible to the average reader.

The second edition of Funk is greatly enlarged in comparison with the slim volume of 1914, and presents a comprehensive summary of the vitamin research work up to the present time, with a bibliography of 1595 titles, which to say the least is an achievement in itself.

In regard to the term vitamin, Funk states as follows: "Despite the fact that a number of ideas originated by us are credited to others, it is a source of great pleasure to witness the great progress that has been made in vitamine research. In our opinion the name "Vitamine," proposed by us in 1912, contributed in no small measure to the dissemination of these ideas. The word "Vitamine," served as a catchword which meant something even to the uninitiated, and it was not by mere accident that just at that time, research developed so markedly in this direction. Our view as to the fortunate choice of this name is strengthened by, on the one hand, because it has become popular (and a badly chosen catchword, like a folk-song without feeling, can never

become popular), and on the other because of the untiring efforts of other workers to introduce a varied nomenclature, for example, "accessory food factors, food hormones, water soluble B and fat soluble A, nutramine, and auximone" (for plants). Some of these designations are certainly not better, while others are worse than "Vitamine."

Sherman and Smith, and McCarrison have not followed the original spelling of Funk, but prefer the suggestion of Drummond that the final "e" of "Vitamine" be dropped, so that the resulting word "vitamin" may conform to the nomenclature of the Chemical Society, which permits a neutral substance of undefined chemical composition to bear a name ending in "in." Whether or not the final accepted spelling of the term will exclude or include a final "e" is a matter of speculation. Dr. H. E. Armstrong has proposed the term "advitant" for these substances which seems to be a fairly good descriptive term, and simply indicates that these substances are necessary to life.

A review of the literature of the subject which may be found in Funk, as well as in Sherman and Smith and McCarrison, establishes the fact most impressively that our future conceptions of nutrition will become more and more developed from the biological chemical standpoint. The knowledge that there is something more in the general nutrition problem than protein, fat, carbohydrates, inorganic constituents and calories, is one of the great advances that has come in the experience of the present generation. What the future will bring forth as a result of these pioneer investigations of the last ten years is unknown, but what has been already accomplished will undoubtedly have a great influence on the nutritional betterment of the race.

The student who wants to know how the conception of vitamins originated, and all about vitamins A, B, and C, their occurrence and properties, and how best to arrange a balanced diet will find an answer in Funk, or Sherman and Smith.

C. B. MORISON.

**Physico-Chemical Studies of Strong and Weak Flours.** I. Hydration Capacity of Gluten from "Strong" and "Weak" Flours. R. A. Gortner and E. H. Doherty. Journal Agricultural Research. 13-389-1918. Abstract. The glutens were washed out from 200 gram

samples of flours of widely different baking strength. Small disks of uniform size, shape, and weight were cut from these glutes, weighed accurately and placed in acid solutions of varying compositions and concentrations for fifty minutes. They were then removed, drained, and reweighed, the change in weight being calculated to change per gram of moist gluten. The amount of water imbibed by the different glutes was measured in eight concentrations of each of the following acids: Hydrochloric, oxalic, orthophosphoric, lactic, acetic, and boric. The effect of adding different salts ( $KCl$ ,  $KH_2PO_4$ ,  $KHC_4H_4O_6$ ,  $CaCl_2 + 2H_2O$ ,  $HgCl_2$ ) to the acid solutions was also tried. The different glutes behaved as typical emulsoid colloids. The two noteworthy differences in behavior between the strong and weak glutes were found to be in their (a) rate of hydration and (b) maximum capacity for hydration. Not only does a weak gluten have a much lower rate of hydration than a strong gluten, but the weaker gluten also has a much lower hydration capacity. In short, the difference between a strong and a weak gluten is that between a nearly perfect colloidal gel with highly pronounced physico-chemical properties, such as pertain to emulsoid gels, and that of a colloidal gel in which those properties are less marked. The hydration capacities of the glutes were correlated with the baking qualities of the flours by baking tests. The imbibition rates and hydration capacities of the different glutes are represented graphically by curves. The data do not support Upson and Calvin's (1915) contention that quality of gluten is dependent upon the kind and concentration of acids and salts present in the dough, nor those of Guthrie (1896) that strength is dependent upon the glutenin to gliadin ratio. The conclusion is that there is an inherent difference in the glutes from strong and weak flours, that the colloidal properties of the glutes from the different flours are not identical and would not be identical even if the flours had the same salt and acid content. **II. The Imbibitional Properties of the Glutes from Strong and Weak Flours.** P. F. Sharp and R. A. Gortner. *Journal Physical Chemistry* 26-101-1922. These authors continued the work on imbibition of glutes to test the hypothesis as summarized in the report of Gortner and Doherty, and to determine if other physico-chemical properties of the glutes from strong

and weak flours could be correlated with flour strength. The same methods were followed as in the previous work. Baking tests and analytical data included dough volume, loaf volume, color, texture, absorption, pH measurements of the bread, and ash, moisture, protein, wet and dry gluten,  $K_2SO_4$  soluble, water soluble, alcohol soluble proteins of the flour. The strong and weak glutes exhibited wide differences in imbibitional capacities for hydrochloric and lactic acids, the latter appearing to be more effective in differentiating the glutes than other acids. The behavior of glutes in dilute alkalies was somewhat different than in acids. N/200 concentrations show greater differences than acids. With stronger alkalies dispersion of the colloid begins coincident with imbibition. The depressing effects of salts in alkalies upon imbibition are in agreement with those in acids. Previous drying of the glutes caused marked changes of the colloidal state and results with these could not be compared to those obtained on the original moist gluten. The optimum hydrogen ion concentration for the swelling of glutes occurs at pH of 3.25 to 2.25 and lies at practically the same value for both strong and weak glutes, and the optimum hydrogen ion concentration for imbibition is the same for various acids. The data and imbibition curves verify the conclusion reported in the first paper of this series. L. A. R.

**Bleaching and Maturing Flour.** J. C. Baker. U. S. 1,404,922, Jan. 31. Gaseous  $HOCl$  is used.

**Bleaching and Conditioning Flour.** E. E. Werner, *Brit.* 165,149, March 1, 1920. Flour is treated with undiluted  $Cl$  to bleach it and improve the nitrogenous constituents. The gas is supplied from a cylinder of liquid  $Cl$  to a worm conveyor in which the flour is agitated, in such quantity that no residue of gas escapes into the atmosphere.

**Dry Shortening Material.** H. V. Dunham. *Brit.* 169,493, June 22, 1920. The product is made by boiling starchy material, such as flour, in  $H_2O$ , adding oil or fat, emulsifying, homogenizing in a disk homogenizer or the like, and drying. Cf. 17002, 1911. (C. A. 7, 399.)

**Food Mixture from Rice and Milk.** J. H. Sasseen. U. S. 1,401,498, Dec. 27. Rice is thoroughly cooked in  $H_2O$  and then mixed with milk and a small amount of fat and the mixture is emulsified to obtain a food mixture adapted for use in pastry.



### *Research that Paid*

NOT so long ago cards on street cars were an affront to the eye and billboards provoked vigilance committees to midnight raids. Artists made pretty paintings to decorate novels, but thought "Commercial Art" beneath them.

To-day an artist designs a candy store to lure a customer, a handsome box in which to take the candy away and an alluring advertisement for the street cars and bill boards to bring him back again. Vigilance committees and pained car riders are a thing of the past.

Just so, the time was when a chemist felt proud in spirit because "he would throw any research problem out of the window as soon as he found it had a commercial possibility." We know one of that kind who is now referred to by his associates as an "interesting relic of the old day."

"Pure Science" like "Pure Art" scorned the commercial. Yet they have been joined to the great advantage both of research and of commerce.

Mr. Coolidge, working in the laboratories of the General Electric Company, perfected the X-Ray tube until now his tube is called for so generally that his company does a business of \$5,000,000 to \$10,000,000 with it and allied products.

A Middle Western baker who felt for years that he could not afford a laboratory at last installed one and then informed us, "he wondered how he had ever gotten along without it." He found it was an asset, not a liability.

For one thing it caused him to reduce his incoming volume of ingredients to 15 varieties from a total previously of nearly fifty. He found that many he had thought were different, were practically the same product, when put to chemical test. Others he found contained harmful matter in

spite of pretty labels. Labels no longer sell him anything. The test's the thing.

This baker was a large one. The smallest baker in the world can have the same service by applying to what should always be his own American Bakers Association. This is one of the services where the smallest and the largest baker can be equally served, instead of the one glaring at the other as a possible foe.

The popular magazine, even, has come to see the world in the light of its research problems. Says Floyd Parsons, important writer of to-day, in the Saturday Evening Post:

"Business men must learn that no research is so pure that it cannot lead to practical results. Everyone interested in the welfare of research must help end the conflict between pure and industrial research."

This means that the foolish scientist who looks down upon his brothers with a sneer because they have gone into industrial research must give over his foolish ways.

And it means that the baking industry must put research men at our greatest problems. In the *Journal of Industrial and Engineering Chemistry* the story is told of one baker who did it and the way he increased his research forces from one chemist in 1915 to twenty-five in 1922.

"And one of these men," says this scientific journal, "saved his employer two months' salary by a report on samples from a single car load of butter. The control which has been established by research upon the raw materials makes possible uniformity in the finished product."

"Time, temperature and other factors which influence fermentation have been established and since no two carloads of flour are alike the data are valuable in determining how fermentation must be varied to secure uniformity."

11.05 Ag.  
BAT

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association.*

Vol. I

CHICAGO, ILLINOIS, JUNE 15th, 1922

No. 6

## The Coming Bakers World's Fair

SOME bakers do not believe in advertising. Some do not believe they have anything left to learn. Some do not believe in studying the reports of research laboratories. Some do not believe in giving Mrs. Baker the treat of a trip far from the Home Town.

None of these bakers will be present at the big Bakers World's Fair to be held at Chicago in September so you who do come can be sure in advance that you will have a powerfully good time.

Nothing has ever been planned like this for the baking industry in its previous years of dough punching existence.

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The biggest baker only got big by studying for himself what the littlest baker in the land here has set out before him.

If he wants to show his wife the big city, he can do it and won't have a minute's bother as to how to proceed. Committees will be waiting every hour of the day to guide the Mrs. on some inviting excursion to some point of optimum interest.

It will be a glutenous convention, full of binder and peppery yeast, whose ferment is a good time.

The message September wirelasses to all is "Come, let's go. We'll have a super-mix at Our World's Fair at Chicago."



# The Summer Plague of Molds

*Their Source and Method of Prevention Described in Important Paper  
From the American Institute's Research Department*

Now that the great summer plague of mold is in the season of its most favorable growth in bakery products as well as in every form of food with which the housewife or the food dealer has to concern himself, any baker may find himself in trouble over mold on any hot and damp day.

New light on how to fight molds is furnished in a most important piece of scientific research which has just been brought to a conclusion by the Research Department of the American Institute of Baking. This research work into the source, method, and prevention of mold infection, was carried out under the direction of Dr. S. C. Prescott, member of the Advisory Committee of the American Institute of Baking, and Head of the Department of Biology and Public Health, Massachusetts Institute of Technology, by J. W. Strieder and R. N. McClellan.

The publication of their report, which constitutes a splendid contribution to the Literature of Bread, begins in this number of Baking Technology. Because of the immediate usefulness of their conclusions these suggestions for combatting mold are summarized in advance:

1. The amount of mold infection is proportional to the sanitary condition of the bakery. It increases with uncleanness and decreases with cleanliness. An excessive attack should shame the baker.
2. The loaf is sterile when it leaves the oven.
3. Mold infection takes place after the bread leaves the oven.
4. Mold growth starts on the surface of the loaf and grows inward; a heavy crust is unfavorable to mold growth.
5. Mold infection is due to air, handling, racks, machines, and wrapping paper.
6. Moisture in the air is necessary for mold growth.
7. Clean, cool air and sunlight prevent growth of mold.
8. Mold infection may be for most part prevented by:
  - (1) Daily scrubbing of floors.
  - (2) Frequent washing of walls and ceilings with antiseptic solutions.
  - (3) Filtering and washing of air in cooling and wrapping rooms.
  - (4) The use of live steam on machinery, racks and conveyors.
9. The development of mold growth is delayed by heat treatment of the wrapped loaf.
10. The application to the loaf of mold preventatives is of little value.

ACCORDING to the latest figures of the United States Bureau of Census, there are, at the present time, 24,919 establishments in the United States engaged in the baking of bread. These establishments involve a capital of \$417,017,457 and employ the services of 159,283 persons. At this time, the industry ranks seventh or eighth, having come up from twenty-second in 1905.

The enormous increase in the use of bakery-made bread as distinguished from that prepared in the home is one of the

striking developments of the past few years. No other article of food is so universally employed as bread, and it is therefore evident that none deserves more adequate consideration as to the character of raw materials and protection during the processes of manufacture and handling. Great advances have already been made in these respects, with the result that the bread of today is undoubtedly far superior to the bakery product of a few years ago, while the protection of loaves by wrapping and by transporta-

tion in containers, which eliminate large quantities of dust and contact with unclean fingers, has gone far to assure the consumer of a clean and sanitary product.

One of the problems which has been of considerable importance in the study of bread-making methods pertains to the molding of bread. This seems to occur at unexpected times, and even under conditions which are supposed to eliminate largely or entirely the possibility of contamination from dirt and dusty air, and it has not been entirely clear to those who have studied the situation as to what the conditions are which determine the molding that has been observed.

The information which is generally accepted among those engaged in the industry may be briefly correlated. Bread molds very quickly in hot and humid districts, and infection is most prevalent during the summer months. Bakers on the Atlantic seaboard are nearly always in trouble during the summer and the trouble also occurs frequently in the central states during the months of June, July and August. Occasionally loaves will mold during the winter months when the bread is wrapped warm and handled under conditions which are presumably favorable for the molding. However, this does not always happen, hence there is a need of definite knowledge.

According to Jordan and other authorities, the eating of slightly moldy bread does not seem to be accompanied by any serious injury to health. At the same time the recorded instances of occasional illnesses attributed to this cause are sufficiently numerous to warrant caution in the use of bread in or on which molds of any kind are growing. *Penicillium*, *Rhizopus*, and *Aspergillus* are the fungi that most commonly attack bread, and there is some evidence indicating that poison-

ous or pathogenic races of these organisms may exist in some localities. Certain Italian observers claim to have extracted toxic substances from both the spores and the hyphae of some of these fungi, while German workers have eaten quantities of moldy bread without ill results.

Most bread reaches the retailer within twenty-four hours after it leaves the oven. In rare cases this time is extended to thirty-six hours. Some western bakers ship bread into a territory fifteen hundred miles across. This is particularly true during the harvesting months in the grain districts. As far as is known, the farthest shipments go about eight hundred miles. More bread is shipped in the summer than in the winter, but year by year the bread business is becoming more stabilized. The total amount of loss due to molding is, of course, but a fraction of the total output and yet in certain parts of the country the loss is really such a serious one that its study is distinctly important.

It would seem from the foregoing as if this molding of bread were a question of weather, humidity, and temperature, yet these alone are but favoring conditions and do not include the most essential factor, the causative agent itself; for obviously, no molding could take place without microbial infection from some source.

The problem we have undertaken, therefore, has the following salient points on which exact information is necessary in order to arrive at conclusions which may be applied in baking practice:

- (1) The causes of molding, i. e., the particular organisms involved.
- (2) The sources of the infection.
- (3) The methods by which contamination of the bread takes place.
- (4) Methods of prevention or inhibition of the infection.

To secure the facts on these and other important matters connected with this



problem, we have made a systematic study of the baking industry.

Although the conditions existing in smaller bakeries were studied to some extent, it was felt that greater service to the industry as a whole could be secured by placing greater stress on the larger sources of supply, and a more exhaustive study was therefore made of some of the modern plants using large scientific methods of control of operations. It is in institutions of this type that the large losses are sustained, and where more profitable results may be obtained should the findings of this work prove useful.

In Boston and its suburbs bakeries of this type are not directly affected by trouble arising from mold infection, because the bread is not over eight hours old when it reaches the centers of distribution. This fact suggests that a high degree of efficiency in distribution may aid materially in reducing or even in preventing the losses caused by mold trouble.

As may be later seen, loaves from these plants which were kept under conditions analogous to those of shipment and sale were without exception found to mold, and it was on such loaves that our work was largely done.

With the ordinary local bakeries the entire output is small, and the overturn of the product is so rapid that mold trouble, except in a few rare instances, is not known on their own premises, and in these few instances the loss is so insignificant that the proprietors of these establishments have little interest in its prevention. However, the fact remains that any bread as handled at the present time will mold and its time of molding may be longer or shorter according to a number of conditions, and it is with a knowledge of these facts that the following work is presented.

Studies here presented were confined to

one type of loaf. This loaf is made from a sponge process dough weighing  $1\frac{1}{2}$  pounds and weighs 1 pound 5 ounces when baked. It is baked in Duhrkop ovens for a period of about 32 to 35 minutes.

### *Review of Literature*

A review of the literature bearing upon this subject revealed the fact that very little work had been published. In English, a few articles were found, but this work was not very extensive; in German, the articles showed a much more exhaustive and complete study.

The work of Dr. W. Herter and Dr. A. Fornet, which appeared in the *Centralblatt fuer Bacteriologie*, 1919, entitled "Studies on the Molding of Bread," treated the subject very thoroughly. The following is a resume of their work:

Eleven molds were found to be present upon bread, as follows, listed in the order of the frequency of their appearance:

*Aspergillus glaucus*, *Rhizopus nigricans*, *Penicillium crustaceum*, *Oospora variabilis*, *Penicillium olivaceum*, *Aspergillus fumigatus*, *Aspergillus niger*, *Aspergillus flavus*, *Aspergillus nidulans*, *Aspergillus condidus*, *Mucor pusillus*.

The molds enter the bakery by means of the flour; the flour, in turn, by careless handling, etc., infects the air and utensils, which finally infect the bread.

The factors concerned in the molding of bread are:

Moisture (of the substrate and the surroundings),

Warmth,

Sugar,

Acidity, and

Oxygen.

The molds which grew most rapidly were *Rhizopus nigricans* and *Mucor pusillus*. *Penicillium crustaceum* was the slowest growing mold. *Aspergillus glaucus* will grow with the least moisture.

The thermal relations were investigated by the workers and graphs were included, showing the rates and extent of growth of various species of molds at different temperatures.

The effect of moisture upon molding was ascertained by various experiments, as also was the effect of heat. Moist air and high temperatures favor mold growth; bread molds quicker in the summer than in the winter.

Experiments to prevent or inhibit molding by the use of salicylic acid and also by changing the grade of flour and yeast, have proved fruitless.

The article contained a complete resume of the literature concerning this subject, though they found nothing in it relating to the most frequent types, at what temperature they appear, etc. The following is a resume of the literature, listing briefly the work carried out by each investigator.

WELTE—Welte was the first worker upon this subject. He treated especially the effect of molding on the chemical composition of bread. He worked with *Penicillium glaucus*, *Aspergillus nidulans* and *Rhizopus nigricans*. The identification of species was uncertain, although great care was taken; no pure cultures could be obtained.

HERTER—Herter held similar views to the preceding and following worker. He carried out several experiments showing on what kind of bread the molds have been found.

WEHMER—Wehmer found *Aspergillus glaucus* chiefly upon black bread.

LAFAR—Lafar sifted the literature upon the subject, and found chiefly *Penicillium glaucus*, *Aspergillus glaucus* and *Rhizopus nigricans*.

LINDAU—Lindau found *Monilia aurea*.

MURTFELD—Murtfeld, in 1917, found *Oidium aurontica*.

LINDNER—Lindner found *Oospora variabilis*.

The changes taking place in bread, due to molding, have been much investigated. It has been found that the nitrogen in-

creased slightly and that the carbohydrate was much used up. Peptones were not found while albumins were changed into partly soluble nitrogen compounds. Welte states that moldy bread is not harmful and produces no toxic effect upon animals; the taste is not bitter. To prove this point, he drank a solution of moldy bread and ate some rolls spread with *Penicillium crustaceum*.

The importance of preventing mold growth on bread is, therefore, not that it produces a toxic effect, but that it is important from the bacteriological standpoint; bacteriosis goes hand in hand with mycosis. Of course, it is also important from an economic view.

The literature, reviewed upon this subject, was chiefly concerned with the types of mold found on bread. There are many illuminating articles listing the types of mold already found, and some, including new groups, hitherto not described.

However, there has been no work found which treats systematically the source and method of infection, or which outlines definite preventive measures against the trouble. The work of Herter and Fornet is perhaps the most complete in this respect, but they lay special emphasis on the studies of molds occurring on bread.

(To be continued.)

### *Change in Yeast Sales*

A MANAGER of a yeast company's branch office prepared as usual this Easter for a large sale of small tin-foiled yeast cakes. Every year previously the making of Hot Cross buns in the home had resulted in a vastly increased demand. This year it was the baker, not the home builder who called for the extra yeast. The manager investigated. He found the bun business had followed the bread business out of the home and into the bakery.



# Catching a Rope Epidemic

*Students Found Traces of Infection in Bread and Speedily Eradicated Its Source From the Afflicted Bakery*

A BAKER whom we shall call Terry because that is not his name, was a most popular man among men, but he had no scientific curiosity about the processes of his bakeshop. We asked about him when a friend from his home town appeared at the National Home of the baking industry.

"Poor Terry," he said, "is gone. Rope got into his bread and in two months it ruined him. He has never got his trade back, and never has cleaned up his rope problem."

Rope is one of those foolish names like ring-worm which isn't a worm at all but an infection caused in humans by a very close relative of the bacillus that attacks bread and decomposes it.

If you have any traces of rope in your shop you must fight it as a plague because the spores of this bacillus breed by the millions per hour and blow about on every gentle breeze or the turning up of dust with a broom.

Principal Peter G. Pirrie of the American Institute's School of Baking went out with a group of students to purchase bread to the purpose of scoring it.

They opened one loaf—and detected at once the foul, putrefactive odor that meant the presence of rope bacilli. The students carried four loaves of this baker's bread to Otis Hall, head of the Institute's Service Laboratory. In a short time he had obtained evidence of the existence of rope bacilli from all four loaves.

Then for the teacher and his students there was another interesting task right ahead. All went together to visit the unlucky baker. They found him glad to see them but shocked and surprised that his

bread contained rope. Principal Pirrie asked to look through the bakery to determine the cause. He found it quickly—the baker was using his flour room as a store room for the return of stale bread. The air surrounding Old Mother Earth is full of invisible creatures all competing with man for his food. When mankind fails to eat his daily bread, these tiny creatures are there hungry for the chance.

They are lower down in the scale of existence than the beginning of arms or legs or sex. So they are self-reproducing and they are so light that any little breeze, such as a breath of air blown from the human mouth, will carry them up and afar into every corner of the shop.

They only seek moisture, warmth, and the right food to set up house-keeping. Principal Pirrie called the baker's attention to the piles of returned loaves. Some had been cut up. There was the Home of Rope in his bakery. In an hour all had been shovelled out and burned—and the flour stored in that room was ceasing to receive infection at a rate about equal to what it would have been if a garden hose had been played upon it full of water rich in bacterial cultures.

In a week the last trace of rope infection had left this baker's bread. And our students had received a new insight into the importance of bakery sanitation. It was equal, they became convinced, to the need for hospital sanitation.

What are you going to do if you notice the first stages of rope in your bakery? You can tell it by its odor of over-ripe muskmelons and the change in the appearance of the crumb whereby the normally white, tender, attractive interior

portion of the loaf is converted into a slimy brownish-colored substance, resembling a mixture of thick starch paste and glue, capable of being drawn out into long threads.

Remember that whenever you have a little of it you are soon going to have a lot, if instant war is not declared. It's an epidemic disease, when hot weather comes, especially if the hot weather is accompanied by high humidity and the slow-cooling of bread in the bakery.

A technical discussion of the scientific problem brought about by rope appears in this magazine. Any baker who suspects the presence of rope could do well to send in samples of his bread to the American Institute.

One who did so, sent in the worst loaf we have ever seen. He was advised to

add two quarts of vinegar per barrel of flour to his mix, to bake his bread out well, and allow it to cool thoroughly in a well ventilated place before wrapping. Six loaves, sent a day apart, proved absolutely free of rope under this treatment. The vinegar ration was reduced by half after the epidemic stage of the infection had passed and was continued at this rate until the end of warm weather.

Sometimes when whole bakeries have become infected it has been found necessary to wash down all machinery in hot vinegar, and to thoroughly cleanse the bakery to remove the major source of infection. To find and eradicate such major infection sources the American Institute will send to any shop that is in trouble an expert capable of cleaning up his rope problem in a very short time.

## Rope and Its Control

THE bacterial decomposition of bread known as rope is one of the possible "hot weather troubles" of the shop. In winter the development of rope is unusual, but in summer especially, after a period of hot, damp and sultry weather, reports of this destructive infection are frequent. That rope is a hot weather "bread disease" has been recognized by all investigators since it was first studied from the bacteriological side by Laurent nearly forty years ago in Belgium.

It is a fact of common experience among bakers that after rope has gained a foothold in the shop it is no easy matter to eradicate it. Unless proper protective measures are taken, the loss of spoiled bread may become very high and the normal production of the plant seriously interrupted. Rope is a dreaded pest of the bake shop and it will be the purpose of this article to outline some of the facts about rope and its control.

The condition known as rope may be described as a decomposition of bread produced by the growth and activity of certain species of bacteria. During their development in the bread, these rope producing organisms bring about certain changes in composition which are generally accompanied by characteristic odors, a softened and sticky crumb, which can be drawn out into fine threads or filaments, a discoloration which is usually brown, and a change in chemical reaction from that of the normal bread. The term "rope" was probably applied to this condition because of the characteristic property of the decomposed crumb to form threads or filaments.

There are a number of species of bacteria which have been reported to produce rope, but at present there seems to be sufficient evidence in the literature to confine this condition in bread to the presence and activity of various species of



bacilli belonging to the *B. mesentericus* group. In fact, some authorities define rope specifically as a "condition brought about in bread by the growth in it of various species of bacilli belonging to the *B. mesentericus* group of Flugge."

### *Bacteria Everywhere*

These bacilli are widely distributed in nature and are found present on the surface of the cereal grains, potatoes and other vegetables, in the soil and associated with many other common sources. The flours and meals milled from the cereal grains, such as wheat, rye, barley and corn, are generally infected with the bacilli of this group.

The degree of infection of a flour varies. Some investigators state that low grade flours are initially more highly infected than the patents. This may be influenced later by storage conditions. If the flour is overheated or stored in a damp place the rope producing bacilli may increase considerably under these more favorable conditions. Nevertheless, there is considerable evidence to show that the composition of the flour has an influence on the development of the bacilli and that whole grain flours and those of high extraction are more favorable to bacterial growth. A high patent flour milled from thoroughly cleaned wheat, and stored under proper conditions, has usually a minimum bacterial count.

It seems to be the concensus of opinion among investigators that flour is the chief carrier of the rope bacilli and that other baking materials are of little significance in this connection. While statements may be found in the literature that yeast is a source of rope, this possibility is of slight importance because it is well established that the bacilli producing rope do not thrive in the strongly acid mash of yeast manufacture. Under unfavorable

conditions of production, however, the yeast might possibly become contaminated with the spores of the rope bacilli and thus infect the dough. The other bread making materials, such as malt extracts and syrups, milk products and shortening agents, under ordinary conditions have little significance as possible sources of rope.

### *Spores Resist Heat*

The spores of the bacilli which produce rope are strongly resistant to heat. Experiments have been made which showed that certain types of *B. mesentericus* survived the temperature of boiling water for thirty minutes to six hours, according to the type of organism exposed. Since the temperature of the inside of a loaf of bread at the center is usually slightly less than the boiling point of water, baking does not protect the bread from future development of rope when conditions are favorable. Recent determinations of the temperature at the center of a twenty-four ounce dough, during a baking period of thirty-two minutes at an oven temperature of 400° F. gave an average reading of 208.5° F. by the thermo couple and pyrometer.

Since the bacilli that produce rope are widely distributed and are probably present in most flour and therefore in most bread, and their spores survive the baking temperature, the question arises, "why does not all bread develop rope and what are the conditions that prevent it?"

### *Acidity the Cure*

Fortunately for the baker, the rope bacilli do not develop at a certain degree of acidity or hydrogen ion concentration. It is very remarkable that the optimum hydrogen ion concentration for the dough of wheat flour which appears to be most favorable for the production of bread, lies close to that hydrogen ion concentra-

tion which will prevent the development of the rope bacilli. Under ordinary conditions rope does not develop in bread because the acidity or hydrogen iron concentration maintained in the dough is sufficient to give the bread the proper reaction to prevent it. However, if conditions are favorable for the rapid multiplication of bacteria, such as high temperature and moisture, rope will develop and the acid reaction of the bread will be reduced and finally overcome by the alkaline products of bacterial growth.

This is one of the reasons why rope is usually a hot weather development. In the winter and cool seasons, conditions are unfavorable for the rapid growth of the rope producing organisms. At a temperature below 65° F. the rope bacilli develop slowly, but when it is raised to 80 or 90° F. growth is very rapid.

The chief factors that influence the development of rope seem to be degree of infection, moisture, temperature, time, reaction and composition of the flour.

The degree of infection of a flour has been mentioned previously and it has been found that under similar conditions, bread prepared from highly infected flours will develop rope more rapidly from those of lower bacterial count. There are also differences in the rope producing properties of the different species and strains of the organisms. Some are more active than others in their effects during growth.

Moisture is always necessary for the development of rope. The rate of development is more rapid in bread of a high moisture content. Under baked bread is more susceptible than well baked out bread. Storage in a damp atmosphere, or under conditions which prevent the rapid removal of the moisture given off during cooling, absence of free circulation of air around the loaves, are also conditions

which favor rope development. Dry bread will not develop rope, even when incubated at 98° F.

The effects of temperature on the development of rope have been previously noted. High temperatures greatly accelerate the growth and activities of the rope bacilli and this is the reason that rope is above all a hot weather "bread disease."

The length of fermentation has some influence on the possibility of rope development. If the doughs are allowed to ferment in the sponge so that the proper acidity is produced, there is not as much danger of rope as in the case of young doughs, though certain investigators have stated that they have found "an equal tendency to rope in bread made with a three, four and nine hour process." Time of proving is also said to have little influence on the rate of growth. The time of storage of the bread, or the period before it finally reaches the consumer, is the most important time factor and if the bread is highly infected, rope may be developed within twenty-four hours under suitable conditions, chiefly of moisture and temperature.

The addition of acids and acid compounds to the dough as a protective measure is usually successful if added in the right proportions. This is a difficult matter because of the fact that the flours vary in composition, as has been previously mentioned, and also to the effects of too great additions of acid on the physical condition of the gluten and bread making properties of the flour.

The use of acid must be carefully controlled or the results will be disappointing in the quality of the bread produced by such treatments. Various substances have been suggested for this purpose, such as vinegar and sour milk, organic acids, acetic, lactic and tartaric, inorganic acids, hydrochloric and phosphoric, and acid



salts such as acid calcium phosphate, acid sodium sulphate and combinations of the latter with acid sodium or potassium phosphates.

Distilled vinegar may be used in the proportion of one pint or one pound of 100 grain vinegar to one hundred pounds of flour. The use of concentrated acetic and lactic acid is more difficult to control successfully than vinegar. The amounts to be added vary with the flour and for the patent flours much less is required than with the lower grades.

About 0.10 to 0.17 per cent of the anhydrous acetic acid calculated on the weight of the flour is sufficient for most patents, and for the low grades about 0.3 per cent. Lactic acid may be used in the proportion of about 0.20 per cent for patent flour and may be increased to 0.4 per cent for low grades.

### *Use of Mineral Acids*

The use of mineral acids, hydrochloric, sulphuric and phosphoric is more difficult to control than the organic acids and the results obtained are not favorable.

Acid sodium sulphate has been used in the proportion of about 0.17 per cent with fairly good results, but more satisfactorily in combination with acid phosphates such as potassium dihydrogen phosphate. Combinations of these salts have been used in the proportion of .04 to 0.13 per cent of the acid phosphate with about .08 to 0.17 per cent of the acid sulphate.

The reaction of the bread is a most important factor in rope development. If the acidity of the bread, or its hydrogen ion concentration is maintained near pH 5.0 there is little danger of rope. This hydrogen ion concentration is close to that which various investigators have found to be the optimum for the production of bread, because of its influence on the physical condition of the gluten and yeast activity.

The effect of the proper acidity on inhibiting and preventing rope has been known ever since the work of Laurent in the early eighties. Laurent recommended vinegar for this purpose, and such additions of acid compounds have been used generally for many years as a method of rope prevention.

The influence of the composition of the flour on the development of rope is also important. It has been found that the low grade flours and so called "wheat substitutes," such as were used as emergency measures during the late war, have a tendency to favor the growth of the rope. This is due largely to the fact that such flours are commonly less acid than high grade patent wheat flour and may contain compounds which have a "buffer" effect on the required hydrogen ion concentration. Water extracts of the low grade wheat and "substitute" flours are more favorable to the growth of the rope bacilli than extracts of the high grade patent wheat flours.

### *Emergency Measures*

The emergency measures for the control or prevention of rope are based on, first, the elimination or reduction of all sources of infection, and, secondly, the addition of acids or acid compounds to the dough. Suspected flour should be eliminated from the shop. Flour which is highly infected by rope can be easily determined by proper laboratory tests. All stale bread should be removed from the bakery premises and destroyed by burning. The shop should be thoroughly cleaned and all dust, dirt and old dough removed and destroyed. The floor, troughs, other utensils and machinery should be cleaned; if the infection is a severe one live steam may be used, followed by the application of a solution of boric acid.

The effect of such additions of acids

and acid salts is to raise the acidity or hydrogen ion concentration to the point where the development of the rope bacilli is prevented. Success depends largely on the care with which these compounds are added, especially in relation to the composition of the flour, and finally to the proper treatment of the bread after baking.

The bread should be cooled as quickly as possible after baking, with proper attention to ventilation, so that the escaping steam is carried away without condensation of moisture on the surface. Wrapping bread before it is thoroughly cooled is dangerous because of the condensed moisture on the crust, which is favorable not only to the growth of rope but to the development of mold. A wrapping paper not too heavily coated with paraffin, or a so-called ventilating paper, is not as objectionable as the heavier or more impervious ones.

Unless the bread is well cared for after baking and precautions are taken to reduce the factors which accelerate the development of rope, especially those of temperature and moisture, the acid treatment may be of little or no value.

The successful control of rope depends on the elimination or reduction of all the factors which produce it from the time the dough is mixed till the bread is consumed.\*

C. B. MORISON.

\* Studies on the Control of Rope in Bread published as Bull. 5 by the American Institute of Baking, discusses the subject from a scientific standpoint and appends a bibliography. Copies of this bulletin will be sent to any baker upon request.

### *The New Zealand Way*

BAKING TECHNOLOGY, to be a common voice for those things that affect all bakers equally, regardless of local conditions, should have at least ten readers for every one it now has. Our own idea is

that the bakers of America are entitled to a National organ to keep them informed on tariff matters, express rate matters, legislative matters, and every phase of baking research that may lead to the making of a better loaf of bread or the obtaining of better ingredients without fraud in fancy labeling.

Our idea, further, is that they are entitled to own this organ themselves and to have it dependent upon nobody but themselves. Hence the entire lack of advertising in Baking Technology. Still further, we believe that if every baker in the land had this contact with his industry's National Home he should be entitled to the services of the most open-minded and responsive editor the country could produce. And at the first proof that we had proved unresponsive to any need of the Industry we should be glad to put on our hat and give way to a new staff. Partisanship has no role here in this broadcasting station.

When Prof. Gortner, in charge of cereal research at one of our great universities, tells us that tightening up the soft glutens until they bake like gluten from the hardest wheats is the most important problem he is working on, we try to spread the intelligence as far as the voice of our printed page can carry. Circulation, therefore, is vital to the service we must render, to be worth while.

Gordon Smith saw it, at Savannah, and arranged for the Southern Bakers Association to distribute this paper, along with a monthly letter inserted by themselves. And we hope to hear from this new body of readers every possible suggestion as to improvements.

In New Zealand the grocers and bakers combined in a magazine to spread commonly desired information. They guaranteed in advance 100 per cent circulation by subscribing in bulk.



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entry in the post-office at Chicago, Illinois, as second-class matter, applied for under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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JUNE 15, 1922

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### *Faith—and Its Works*

COOPERATION means fellowship, and fellowship means a mingling and mixing of people for their own welfare. The old idea of one head of an organization driving its membership, perishes when the cooperative plan comes into action.

For that reason conventions become the most important element in a cooperatively organized group. It is at the conventions that the membership drink in all the new ideas afloat about their industry.

The greatest convention the baking industry has ever known is scheduled for the Municipal Pier, Chicago, from September 11th to 17th. It occurs in cooperation with the greatest Exposition of baking machinery that has ever been attempted.

Retail bakers will bring to it their problems of handling neighborhood trade that are no less real

and deserving of solution than the largest-gearred problems the industry knows.

And bakers, both large and small, will see machines that can do the work they once had to bury themselves in their own dough troughs to do. The machines are of every size and capacity. The modern way is to let the machine do it, instead of continuing to let George do it.

And as every machine takes over some task it frees a baker for better work, just as through its use he helps to free some woman for better work than bending her back over an old-fashioned kitchen range.

The machines, therefore, are important. And the fellowship that will accrue from the convention week is important.

We are speaking of this week far in advance because every baker whose wife is planning a summer trip needs to be informed far enough ahead for her to decide that this trip is the one to take. In Chicago plans are being matured for the best kind of a program it is possible to assemble.

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### *Concerning Superwages*

HAS IT ever occurred to you," writes a baker of Bozeman, Montana, "that bakers' wages have increased so much in the last five years that they constitute a serious

handicap to the baking industry? This is by making it harder and harder to keep the price of bakers' bread close to the cost of home baking, so that the housewife will turn to our bread, and not make it for herself."

Something very like this occurred to the Mayor of Tiffin, O. In defense of his plan to open municipal bakeshops he charged that the employing bakers of America had been recreant to their duty to the public in that they had not "gone to the mat" with their employees, and forced them to take deflation wages the same as the rest of us.

This Mayor served a community whose members were on half time or were laid off in a period of industrial depression. The heavy losses through refusal of various groups to take to post-war conditions, are visited upon the heads of this generation, wherever its children turn. In New York the bake shop employees who had refused wage adjustment from war-time peaks were hailed before a legislative committee. The baking field is so highly competitive, and the cost of entering it so trivial that the chance to pay super-wages seldom can lead anywhere but to loss of sales.

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Baking machines may lack intelligence but he who trusts them and hustles trade seldom has to ask for trust at the bank.

## *Barberry and the Baker*

THE FACT that "black rust" caused a loss of over \$10,000,000 last year to Minnesota grain growers was responsible for the sending out of 200 weed inspectors this year. They will fight the barberry plague in every county. The U. S. government will cooperate with them. A feature of these huge losses of which bakers will never lose sight is that they themselves lose almost as keenly and definitely as the millers and farmers, for the fields affected are among our best sources of hard wheat.

If the fight on barberry fails, the hard wheat supply of America fails. By the same processes that the baker conquers "rope" bacteria and the surgeon conquers its near neighbor, the gangrene bacteria, chemists will now fling themselves at the virulent black rust that devastates wheat fields in just the way that yellow fever formerly devastated Cuba and Panama. There is something very similar in fact in the work of these 200 inspectors in the Northwest and in the work of the U. S. Public Health Service's chemists that cleaned up Panama and made it safe for white men. They may make wheat fields safe for wheat by the same process, and thus add another laurel to their wreath of triumphs for the Civilization of our day.



# A Baker in Trouble

*And How He Won His Way Out By Appealing to His Association  
for Laboratory Help*

OLAF LUNDSTROM was a small baker in South Dakota who thought at one time that the effort to form a National Association of bakers was "a big man's show" and he would "let the big fellows pay the fiddler."

So he scorned to join and he advised his friends of many bits of gossip and inuendo against "certain gobbling big fellows." He worked to keep them all out.

We will explain, for the sake of literal accuracy, that the name of our baker was not actually Olaf Lundstrom. We are just putting that name in so that nobody will be able to use this story for any purpose other than the one for which it is intended. The only fictional bit about it is the name.

Well it so happened that Olaf got into deep trouble. He had long made the best bread in this town and he was proud of the fact that folks came on foot to buy it from points further away than a certain other baker was from their homes.

His doughs, he found, were habitually "slacking off." His loaves lacked volume, bloom, and flavor. He noticed sadly as he sold them that old-time customers were failing to come back for more.

As it happened Olaf had business in Chicago, and he thought he would bring his dough room troubles along with him. He put some of the water he used in his bakery in a two quart jug. He picked up a ration of his usual yeast supply, and a quantity of his flour, salt, and shortening.

Thus burdened he came into the new home of the baking industry and to O. W. Hall, chief of the service laboratories, he told his story.

Hall was a good listener for there was nothing "highbrow" about this service work.

"We will bake some sample loaves," said the laboratory chief, "with your flour and all your other ingredients, including your bakery's water supply, and then we will try some with your flour and our water supply and our yeast and we will see if we can locate where the trouble is."

That seemed reasonable and comprehensible to Olaf. He went off down town, with a promise to return when the loaves should be ready for comparison.

On the way he passed many floral shops, and on each and every one, whether small or large, he saw the sign "Say It With Flowers."

All at once he got an idea. "Say," he said to himself, and afterwards to the manager of the American Bakers Association, "if the big florist is a trade competitor of the little florist, both may stimulate the desire to use flowers by that nice reminder "Say It With Flowers." Then having gotten together as far as they can, to stimulate new trade in flowers, they come to the point where they drop out of their fellowship and go in and compete for the trade that is developed."

"Yes," suggested the manager of the Association when this idea was broached, "that is the way our bakers have got to see the situation before they will ever see where they can help themselves most, and not harm themselves by futile hatreds and factional notions that do them no good. We are always glad to see a baker like yourself, who has got the vision of the right way to work in the 1922 fashion of cooperation."

Then Olaf went down stairs to Mr. Hall's laboratories. Hall was just pulling some loaves out of the oven made with all of Olaf's home-town ingredients.

"They are fine," Hall explained, "as good a bake as anyone could wish."

On the table was another dough, in process of fermentation.

Olaf punched it with his finger.

"It's about 76 degrees" he remarked, with a true rule-o-thumb man's tone of confidence in his temperature guesses.

"No," said the laboratory chief quickly. "It's about 80. And I'll wager I know now what's wrong in your bakery. You have lost or broken your thermometer and your luck at guessing has gone back on you. If 80 feels to you like 76, then when it feels like 82 to you it must be close to 90. What temperature do you find brings the best results?"

"About 82" said the puzzled baker.

"And you have been running your doughs all over temperature and they have been slacking off," put in Hall.

"Yes," confessed the baker, "I did break my thermometer and I have been guessing. I never knew a few degrees off would make such difference."

Just to show him a bake was run through with a temperature control which allowed just the temperature Olaf must have been using when he was "guessing" his dough stood at 82 degrees.

"That's fine," he admitted, "that's it—slacks off just like my doughs did."

Olaf was taken through the laboratories and given every possible suggestion as to ways to make a better loaf.

Why? Not for his sake alone. The far sighted bakers who supported this movement knew that **every bad loaf of bread sold unsold some person on baker's bread.** They knew that when some baker like Olaf was pulled out of his trouble, it pulled the good name of baker's bread out

of trouble. They knew that quality bread helps every baker.

And so all were glad when Olaf went away happy. And the end of the story? It came in a letter to Mr. Hall: "I am making the best bread in town again. I have a new thermometer. I have carried out all your suggestions and things are going better with me than ever before."

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### *From Our English Visitors*

To the American Institute of Baking:

We feel that we cannot leave New York without expressing to you how grateful we are for the way in which you received us, and the kindness shown to us in permitting us to see your plant. Our visit to the Bakers of this country has been with the idea of studying the methods, and also to see the modern machinery as applied to the production of bread. What we have seen has been very interesting, indeed, and will certainly prove helpful when we return home.

J. A. BUTTERWORTH.  
GEO. WARBURTON,  
WM. WARBURTON.

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### *A Fine Experiment*

IN READING, Pa., bakers became interested in a Bread and Milk Week. It led them to a permanent interest, as citizens, in under-nourished and defective school children. The bakers employed a dietetist, and put pitiful victims of malnutrition on a bread, milk, and fresh butter diet. They supplement the diet with exercise and proper brushing of the teeth. And they are obtaining some wonderful results in weight increases. As the experiment progresses Baking Technology hopes to tell the results, as they are furnished by Jas. A. Schofer, baker and public spirited citizen.



# What A Baking Student Finds

*After Eighteen Years in a Bakery He Learns His Art Anew*

By B. M. ELICH, of Mansfield, La.

FOR eighteen years preceding this year I was a baker in the South, and for the past month I have been a student in the School of Baking of the American Institute of Baking, organized by the baking industry for the members of the industry who wanted to learn the latest word in baking science.

I am not a writer but I am certain from this month's experience that if I had known what I see there is here to learn eighteen years ago I would now be a millionaire, or at least very well to do, instead of a man who has been "crowded" as a small baker, working eighteen hours a day, very often in his shop.

I believe the time has come when every baker must know WHAT HAPPENS CHEMICALLY in his bakery when he makes bread, and therefore I am writing this article, I hope, for the benefit of every baker who faces the conditions I faced when I sold my shop and came to the School of Baking.

I know now just what I did in the wrong way and how it led to trouble and losses, instead of to profits and success. My worst fault, perhaps, was that I worked so many hours a day inside my shop and gave so little thought to problems of keeping in touch with what my buying public was thinking. I believe others may escape my mistakes and find themselves much more speedily than I have done on the road to real success.

Looking backward over my eighteen years in the business I can scarcely credit my books. They show that out of a gross business of from \$8,000 to \$10,000 a month my profit in all these years has hardly amounted to \$7,000. I did not

keep an accounting system. That seemed to be too complicated. I simply paid the bills and if I still had money in the bank when they were settled I called it "good business" and let it go at that.

Sometimes I had a book-keeper on part time, and did all of the baking I could myself. The business grew until I needed the services of three women and four men and I considered myself a wholesale baker as much of my business was a shipping one.

While I was working such long hours I considered myself too busy to read much, and that I know now was a mistake. Conventions seemed too expensive to attend. I know that too was a big mistake. I sometimes read of ideas others had used successfully but I could not apply them to my own case. I read advertisements of new products for the baker that would make better or cheaper bread. I tried many of them but I could not make them work in my shop.

Now I know why this was so. It was because I did not know what was taking place in the dough trough or the pan. I knew how to do things but not WHY or WHAT I was doing. I have been a member of the National Association for years but somehow I never saw the possibilities of it. I received the Association letters from time to time, but seldom read any of them. In other words, I was what so many of the small bakers of the country are to-day—so intent on the details of the shop that I let the bigger opportunities slip by me.

My business gradually dropped off during the past year and it suddenly made me sit up and think, I suppose for the

first time, of where I was going and why the loss of business in towns where I had had a well established trade. I found that my business was going to a large concern that operated a large number of bakeries all through my section of the country.

### *Met Large Unit Competition*

I found that this concern had a central buying office, that all materials had to meet the approval of their chemists, that every ingredient which they used in their bread had been tested in their laboratories and that they knew before any ingredient ever went into the shop just what it would do, just the proper conditions for its use, and the best proportion in which to use it. I knew that when a salesman offered them a new substitute or ingredient that they had a means of trying it out thoroughly before they ever took it to the shop.

I knew all these things in a general sort of way but did not know how they tried these products before they appeared in their bread; I thought this sort of work could be done only by a chemist with a college education and I knew I never could do it for I never had had the opportunity to go to college. At one time I had tried to decide for myself which of three flours which I had offered to me were the best. I sent them to a chemist for analysis, but the only part of his report which I could really understand was that the bill was \$12.50.

The figures which he gave me meant something to him, but not to me. After that experience I let the idea of having a chemist help me go, and thought I would just fall back on my old ways of guessing from the appearance which was the best.

I bought the most expensive materials I could, thinking that since the price was high they would suit my purpose. I found that ingredients which others could use

successfully would not work at all for me. I was getting discouraged at my inability to make a go of my business which I had worked so many years to build up when suddenly the announcement of the American Institute of Baking School of Baking caught my eye. I wrote a letter asking for information about it, and the upshot of it all was that I sold out my business and decided to take the course, hoping that with the knowledge of WHAT I was doing in my grasp I could succeed as I never had been able to do before.

I have been in the school now for a month and have learned more about baking in this short time than my eighteen years of practical experience ever taught me. I had never stopped before to investigate WHAT the ingredients of my dough were there for, HOW they acted, or whether there was any difference between different brands or kinds of materials. The only way I had of doing this was by running a batch through the shop and I couldn't afford to take the chance of spoiling a whole barrel of flour just to satisfy my occasional curiosity.

The knowledge I have gained about the composition of ingredients and their properties has shown me where I failed.

I hardly know how fully to express what I know I will get from the entire course with its instruction on cost accounting, sales methods and the many other broad sides of baking as a business that I have never known. This I do know, it will certainly show me how to make a loaf of bread better than any I had previously aspired to and give me a confidence borne of knowledge that no number of years of experience alone could give me. If I could but tell better to the thousands of bakers throughout the country who have not yet seen the vision of what I now see, I should ask for no better opportunity to serve our industry.



# The Evil of the Fly in Bakeries

*The Female Lays 120 Eggs At a Time Ten Times a Summer*

By DR. WILLIAM C. WITTE

*Passed Assistant Surgeon, U. S. Public Health Service, Assigned to Survey the Baking Industry at the Request of the American Bakers Association*

UNTIL workers in great enterprises in the tropics learned that diseases which devastated their working forces were carried from person to person by mosquitoes, it would have been impossible to teach them to oil mosquito swamps and break up all out-of-door containers for stagnant water.

Similarly it was the lesson of typhoid epidemics in army camps which taught them to burn all refuse after meals and practice sanitation in a way that made the private soldiers and the sergeants almost as enthusiastic as the camp sanitarians.

In the baking industry, particularly if the horse-delivery system is used, there is opportunity for flies to breed near a bakery which will plague the place.

If the average baker knew that a house fly lays her eggs in manure and decaying rubbish, and lays enough in a summer so that her progeny alone can pile up a weight of 810 pounds, how many bakers would hesitate about extending their sanitary watchfulness several hundred feet in all directions from their baking plants?

It is essential that every industrial plant manager, whether baker or mill man of any kind, regard the house fly as an enemy of his welfare. It is a mechanical carrier of disease, for it walks in filth that is laden with disease germs and then flies away with its tainted feet to deposit these germs upon the next spot where it happens to alight.

This spot may be a dish on which a bakery worker plans to eat his dinner, a towel from which he can carry germs to

his face, or a wrap which he plans to wear home to the midst of his family. In addition to walking through decaying filth and depositing her eggs in it the fly eats such filth and regurgitates it on food stuffs on which it alights. If killed her digestive tract becomes a source of the widespread distribution of germs.

You can gain a good picture of the facts in this matter if you stop to realize that scientists have found as high as 28,000,000 germs in the digestive tract of a single house fly, and as high as 4,000,000 on its hairy legs and body.

To know how to handle the fly problem the baker must know the habits of this incessantly present little visitor. It has been found by scientists to be a carrier of such diseases as typhoid, infantile diarrhoea, cholera, and tuberculosis.

Last fall the fly colonies were seeking barn rafters and bakery ceilings, if they could get in, and any places affording shelter and warmth. All those screened out of such places died. Now Mrs. Fly is coming forth and is busy laying her first Spring crop of eggs. Her favorite spots are manure, garbage, poultry pens, bodies of animals and heaps of refuse.

Once the eggs have been laid they progress rapidly into the stage of doing harm. Larvae are hatched out in from six to eight hours, and four or five days later the larva enters the pupal stage. In another five days the adult fly emerges. It is seen, therefore, that from ten to fourteen days from the laying of the egg we have a new generation of flies.

## EXAMPLES OF BAKERY COSTS AND PROFITS IN 1921

*As prepared for Baking Technology from Eleven Bakeries, each using less than 25,000 Barrels of Flour Per Year by John C. McAlpine, Member American Institute of Accountants, of 1411 Walnut Street, Philadelphia, Pa.*

	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Barrels Used .....	5,785	5,913	15,993	5,711	8,435	10,461	23,782	19,601	14,145	8,026	16,390
Barrels Used per Week....	111	114	307	110	164	201	457	357	272	154	315
Flour Used .....	\$ 9.45	\$10.84	\$12.64	\$11.99	\$12.33	\$12.31	\$ 8.64	\$ 9.50	\$11.01	\$ 9.38	\$ 9.84
Other Materials .....	.....	.....	.....	.....	.....	.....	1.97	2.12	.....	1.58	2.18
Bakers Wages .....	1.45	1.67	1.15	1.62	1.39	1.59	1.58	1.25	1.37	1.26	1.71
Operating Expenses .....	1.39	1.31	1.08	1.47	1.31	1.07	1.14	1.17	1.14	1.19	.96
Wrapping and Packing Exp. ....	.33	.77	1.18	1.07	1.00	1.26	.78	1.54	1.28	.96	1.05
Horse, Wagon and Auto Exp. ....	.57	1.88	.97	2.28	2.24	.56	.42	.68	.68	1.66	1.24
Drivers and Route Wages....	1.09	1.68	.69	1.56	2.12	1.03	.65	.56	.70	2.04	1.58
Delivery and Shipping.....	1.36	.77	.58	.08	.16	.88	.73	1.11	1.43	.35	.44
Advertising .....	.....	.....	.18	.07	.31	.06	.68	.15	.....	.....	.16
Office Expense .....	.67	.50	.14	.25	.24	.23	.64	.30	.15	.28	.46
Other Expenses including Interest, Taxes, Ins. and Superintendent .....	.76	1.42	1.02	.99	1.72	1.80	1.24	1.81	2.41	1.89	.52
Bad Debts .....	.07	.07	.....	.....	.....	.....	.06	.08	.08	.....	.....
Depreciation .....	.66	1.04	.81	1.14	1.76	1.14	.24	.60	.46	1.31	.86
Total Expenses .....	\$17.80	\$21.95	\$20.44	\$22.52	\$24.58	\$21.71	\$18.77	\$21.15	\$20.86	\$21.90	\$21.00
Sales .....	21.60	22.84	23.57	23.21	23.84	22.82	20.71	22.69	22.04	23.15	21.54
Profit per Barrel.....	\$ 3.80	\$ 0.89	\$ 3.13	\$ 0.69	.....	\$ 1.11	\$ 1.94	\$ 1.54	\$ 1.18	\$ 1.25	\$ 0.54
Loss per Barrel.....	.....	.....	.....	.....	\$ 0.74	.....	.....	.....	.....	.....	.....

### COST ON PERCENTAGE OF SALES

[illegible]



# A Bread Assault Overplayed

*Editor Asks if Necessity of Packers Was Merely Coincidental  
With Collier's Weekly Article by Dr. Woods Hutchinson*

WHEN Dr. Woods Hutchinson, a privileged character of the medical profession who is allowed to write "popularly for the lay public" without the censure that is applied to most of his kind by their National and State medical associations, broke forth against bread as a food, a number of other things were also happening.

Meat, the oldest friend and companion of bread as a food, was in need of stirring defense, for meat was being less eaten than formerly. Bread, you know, got its start in Middle Ages eating habits, by being baked into plate-shaped sizes. Slices of roast beef were laid on the bread and the gravies were permitted to permeate the bread while it served as plate.

Diners soon found the gravy-soaked bread more appealing to the appetite than the load of meat it carried. Plates came—but the loaf of bread could never be displaced. Now that meat reaches out for friends, the editor of Northwestern Miller reaches out also for some literary inquiries.

Under the heading of "The Packers' Predicament" he pays his respects to the once-honored Collier's Weekly and to Dr. Woods Hutchinson and to Meat in these words:

## *Packers in Trouble*

The packers have found the consumption of fresh meats falling below production, and a serious situation confronts them. To stimulate the demand is the obvious solution of the difficulty; either that or to combine and reduce production. The public taste has become less friendly to meat eating than it once was, having a greater variety of foods to choose from. One of the three meals a day, breakfast, once meat demanding, has

ceased to consume it. Almost everywhere in America fruit, cereals and eggs, with an occasional slice of bacon or ham, now constitute breakfast; people have, generally speaking, abandoned eating heavily of meats at this time of the day simply because they have found they feel better for it.

This change alone means a heavy loss in the consumption demand for fresh meats, and the packers feel it. If they would devote their efforts to making their bacon and ham choicer and more appetizing, as well as cheaper, they might materially increase the consumption of these products at breakfast time, but they want to bring back steaks and chops, and in order to do so they have apparently attempted a collective propaganda.

They realize that in order to increase the demand for meats it is necessary to decrease the consumption of something else; the human appetite will not take in additional food, no matter how well or how ingeniously it may be advertised. From an article in Collier's for June 3 by Dr. Woods Hutchinson, entitled "Why Do We Eat?" it would appear that bread has been selected as one of the food products to be displaced in order that the demand for meat may come up to productive requirements.

## *A Hutchinson Coincidence*

Just what the relations existing between Dr. Woods Hutchinson, Collier's and the packers may be, whether purely academic and disinterested, or strictly commercial, or a happy blend, whereby the ethical susceptibilities of author and publisher are properly safeguarded and protected, the general public is not informed. Perhaps, even probably, there is no connection whatever between the acute necessity of the packers to increase the consumption of meat and the eager willingness of Dr. Hutchinson and Collier's to advocate so emphatically and unreservedly its more liberal use as food. Let it pass as mere coincidence.

As such, however, it is strange that the tenor of his entire article should be so closely in accord with the interest of the packers as to suggest this to the casual reader as the source of its

inspiration. Dr. Hutchinson goes so far and so strong in his denunciation of bread as to defeat his object, if that be an increase in the consumption of meat. He badly overplays his hand, and as he is careful to ignore the relative cost of bread and meat in proportion to their food values, it is clear that he is not anxious to do justice to the former.

### *Bread Is Cheaper*

If bread is to be sacrificed in order to make room for meat, Dr. Hutchinson's argument is altogether too sweeping and unreasonable to carry weight with the consumer who is to be persuaded to abandon the cheaper for the dearer food. He will ask for something more convincing than Dr. Hutchinson's mere dictum before he will shift from a food he is accustomed to and likes to the one so strenuously over-urged. Concerning bread Dr. Hutchinson says:

"Man cannot live by bread alone. Bread may be the staff of life, but it is a clumsy kind of club without the blood-red iron of meat to put a point on it and turn it into a spear or pike.

"As faith without works is dead, bread without butter is dry in more senses than one, and the problem of knowing on which side one's bread is buttered should be solved after the classic fashion of George Washington, by seeing that it is buttered on both sides.

"The modern health counsel of Polonius is not 'Put money in thy purse,' but 'Put butter on thy bread,' and put it on thick.

### *Too Starchy*

"The emphasis of modern up-to-date dietetics has shifted over completely. No one bothers about mere bread, because almost any one can get plenty of it or its cheaper equivalent in rice, corn meal, or potatoes, to keep him alive and give steam power. In fact, most people today, especially us workers, eat a great deal too much bread or other cheaper starches, and our problem is to eat less bread and cheap starches and more milk, butter, meat, fruits, and green vegetables.

"Among the working classes in England and in our own great cities and factory towns, there is actually a great deal of bread-and-jam-and-coffee, or bread-and-margarine-and-tea anemia from living too exclusively on this most unwholesome cereal.

"'Eat less bread!' should be our slogan, and more milk, meat, bacon, fruits, and green vegetables.

"Not a few of us workers actually take two thirds of the entire fuel value of our food in the shape of bread. The man who stands on the bread line and lives chiefly upon bread will always be a down-and-outer; weak, lazy, easily discouraged, because bread puts no 'fire in the belly' or courage in the heart.

"The troops that ate the most meat and the least bread—the New Zealanders, the Australians, the Canadians, and our own doughboys—made the finest shock troops in the war. And when Germany began to run out of meat, animal fats, milk and cheese for her shock troops, her doom was sealed, though she had enough bread, starch, and vegetable oils left, right down to the armistice."

### *Significant Doctoring*

The reader will note, in view of the packers' predicament with some covert amusement, that every time the Doctor takes a slam at bread, he is careful to say a good word for the "blood-red iron of meat." It is significant. To pronounce bread "this most unwholesome cereal" is going some, even in the line of sensational food propaganda.

Most of his statements are mere superficial expressions, which carry no weight as arguments or reasons for the faith he pretends to have in him. No one advocates living on bread alone, no one denies that bread should be buttered, on both sides even, if the eater so prefers it.

### *Soldiers and Bread*

Certainly the soldiers he mentions had more meat to eat than others; they also had plenty of bread, and it was good bread and they ate enormous quantities of it. Dr. Hutchinson's information that the Germans had enough bread left at the close of the war to supply their troops must have been received through private and exclusive sources, for it certainly does not accord with the facts as given through other channels.

Spokesmen for meat have often told us how much they resent bread advertising that extols the worth of bread, butter and milk, as against meat. We should like to hear from them further, and from Dr. Hutchinson as to what's really ailing with him and Collier's, with which no Collier has anything to do.



# A Study of Self Rising Flours

*As Made in the Analytical Laboratories of the  
American Institute of Baking*

**D**URING the past few years millers of soft winter wheat flours have developed a large business in the sale of so-called self-rising flours, especially throughout the southern states. These are composed of flours of varying grades to which leavening ingredients and salt are added. Calcium acid phosphate is a common acid reacting ingredient and bicarbonate of soda is the alkali reacting ingredient. The ease with which these flours can be made into biscuits by merely adding water, a shortening agent and then baking in a hot oven has popularized their use in those parts of the country where the eating of hot breads is generally practiced. It is obvious that a family which secures its bread ration wholly or largely in the form of hot biscuits eats very little yeast raised bread.

In an endeavor, therefore, to determine the character of the self-rising flours and especially to obtain accurate data as to their general composition, the American Institute of Baking has analyzed some forty samples of so-called self-rising flours purchased in various cities and towns throughout the southern states. The flours were analyzed both chemically and microscopically and from the data obtained the indicated grade of flour was established. The following determinations were made: moisture, protein, ash, bran count, hair count, total offal, salt, sulphates, phosphates, lime, iron and aluminum phosphates, available carbon dioxide, residual carbon dioxide, and total carbon dioxide.

In noticing the odor of the flour itself, two samples are found to be slightly

musty, one decidedly musty and two off.

Seven biscuits were baked from each sample by the use of the instructions given on the label. These biscuits were weighed and their volume was taken, after which they were scored as to the color of the crust and its appearance, and the color of the crumb and its character. The taste of the biscuits was also observed.

Except in cases where it is otherwise noted, the chemical analyses were made by the methods of analysis of the Association of Official Agricultural Chemists. The determinations of carbon dioxide were made by Jacobs' modification of the Truog (1) method and the determinations of sulphate were made by the Howard (2) method for determining sulphates in bread. It was found impossible in determining the grade and character of these flours to make use of the usual methods available and a microscopic method devised by Keenan and Lyons (3) was used to determine the indicated grade from a count of the offal present.

The chlorine was determined as follows: A 5 gm. sample was digested for two hours on a steam bath with 100 c.c. water and 20 cc. concentrated nitric acid. The solution was filtered and chlorine determined on the filtrate by the Volhard method.

The baking experiments were conducted by a modification of the standard method of making biscuits used by Jacobs (4) in previous experiments while in the Bureau of Chemistry, except that in this work no leavening agent or salt was added to the samples of self-rising flour.

The procedure was as follows:

### *Formula*

Flour, 250 grams.

Water at 15° C., 140 c.c.

Shortening, 10 grams.

The shortening and flour were mixed dry until uniform and free from lumps. Water was added and the mixture stirred just long enough to obtain a complete and uniform wetting of the flour. The dough was placed on a bread board previously dusted with dry flour and divided with an embroidery hoop approximately one-half inch high. The dough was dusted lightly with dry flour and rapidly flattened out and rolled once to the thickness of the hoop. Seven biscuits were then made with a two-inch biscuit cutter. These were immediately placed in shallow baking pans and baked for twelve minutes at about 440° F. A gas fired Hubbard oven was used. After cooling for one hour the biscuits were weighed, measured and scored.

The indicated grades given to these flours are based on the micro-analysis and where there was any doubt the higher grade was given to the flour in question. (See table No. 1.)

In grading the samples by this method we find the following indicated classification:

Straight or better.....	18%
Straight .....	30%
Straight to Clear.....	38%
Clear .....	14%

Although statements such as "Soft Winter Wheat Patent," "Fancy Patent," "Superlative Patent," "Best Patent," "Our Best Soft Winter Wheat," "Choicest Pure Soft Winter Wheat" were found on the labels, our analyses indicate that no patents or indicated grades above straight or better were present and of the four

flours claiming to be patents three of the analyses indicate to be straight and one clear.

Considerable variation was found in the amount of total ash present, the ash varying from a maximum of 5.30% to a minimum of .80% with an average of 4.04%. The flour containing an ash of .80% was found to contain no leavening ingredients. The next lowest ash to this was 2.44%. There was also a marked variation in the salt present, a range of 2.48% as a maximum to .059% as a minimum with an average of 1.82%. The flour containing .059% of salt is the same flour referred to immediately above. The next smallest salt content to this was found to be .91%.

Most of the labels stated that the product was a mixture of flour with acid calcium phosphate, bicarbonate of soda and salt, no mention being made of the use of calcium sulphate in addition to these ingredients. The amount of phosphoric acid found varied from 1.74% to .41% with an average of 1.31%. The flour containing .41% of phosphoric acid was the flour to which evidently no ingredients whatever had been added. The next smallest phosphoric acid content to this was .87%. The phosphoric acid determined included the phosphoric acid present in the flour from which these self-rising flours were made. According to Jacobs (5) soft wheat flours of grades of straights or better do not normally contain more than .25% of phosphoric acid. A large number of samples of soft wheat flours examined by Jacobs have shown not more than .17% of phosphoric acid. The amounts of phosphoric acid found in excess of these figures show that in all cases except one where obviously nothing had been added to the flour, that phosphate has been added. The low iron and aluminum phosphate content



TABLE No. 1  
Grade and Character of Self-Rising Flours.

Number of Sample	Statement on Label	% Moisture	% Protein	% Ash	Offal Count Bran	Offal Count Hairs	Total Offal Count	Indicated Grade	Odor
111	Bleached, self rising....	12.86	9.07	3.85	220	88	308	straight to clear	O. K.
112	Fancy patent, self rising	11.70	8.22	4.37	143	55	198	straight	O. K.
113	Soft wheat, self rising..	12.11	7.84	3.55	77	44	121	straight or better	O. K.
114	Bleached, self rising....	11.46	8.70	4.21	176	77	253	straight to clear	O. K.
139	.....	11.94	9.40	4.54	242	132	376	clear	O. K.
140	.....	11.27	8.74	3.80	253	88	341	straight to clear	O. K.
162	Blea., best wi. wht., flour	12.28	8.53	4.25	165	55	220	straight	O. K.
163	Bleached .....	11.99	9.22	4.11	176	55	231	straight	O. K.
164	Bleached .....	12.22	8.51	2.44	176	66	242	straight	O. K.
165	Blea., soft win. wht., pat.	11.90	7.82	4.15	165	55	220	straight	O. K.
166	.....	12.21	9.77	4.45	220	121	341	straight to clear	O. K.
167	.....	12.70	8.74	3.96	132	44	176	straight or better	O. K.
168	Bleached .....	13.67	7.86	4.13	154	44	198	straight	off
169	.....	14.33	7.13	3.80	253	88	341	straight to clear	O. K.
170	Best patent .....	13.17	7.07	4.54	275	132	407	clear	O. K.
171	Artificially bleached ...	13.18	7.55	4.27	154	66	220	straight	off
172	Artificially bleached ...	13.27	7.77	4.09	176	66	242	straight	O. K.
201	Bleached .....	12.03	9.30	4.30	187	66	253	straight to clear	O. K.
202	Blea., best soft win. wht.	12.87	8.50	4.27	99	33	132	straight or better	O. K.
203	Bleached .....	13.15	8.58	4.08	143	55	198	straight	O. K.
204	Blea., choi'st pure soft win. wht.	12.03	8.90	4.20	187	44	231	straight	O. K.
205	Matured-bleached .....	12.42	7.50	3.28	110	44	154	straight or better	O. K.
206	Blea., soft winter wheat	12.51	8.26	4.06	176	88	264	straight to clear	O. K.
207	.....	12.95	6.22	4.24	275	88	363	clear	O. K.
208	Bleached .....	13.40	9.82	4.46	275	110	385	clear	musty
209	Bleached .....	12.71	7.82	2.70	187	99	286	straight to clear	O. K.
210	Bleached .....	12.78	8.90	4.39	242	110	352	clear	O. K.
211	Bleached .....	13.67	8.46	4.03	132	55	187	straight or better	O. K.
212	Bleached .....	12.60	9.50	4.14	198	55	253	straight to clear	O. K.
213	Blea., superlative patent	13.18	8.54	4.37	165	77	242	straight	O. K.
214	Bleached .....	12.97	9.42	4.45	176	55	231	straight	O. K.
215	Bleached .....	12.91	7.26	3.98	187	88	275	straight to clear	sl. musty
216	Blea., best win. wht. flo.	12.38	7.98	4.11	110	33	143	straight or better	O. K.
217	Bleached .....	12.97	10.05	5.30	253	110	363	clear	O. K.
218	Bleached .....	12.85	8.50	4.00	187	66	253	straight to clear	O. K.
219	No marks .....	13.90	7.02	.80	220	44	264	straight to clear	O. K.
220	Artificially bleached ...	13.61	8.22	4.22	253	88	341	straight to clear	O. K.
221	.....	11.48	8.94	4.20	231	99	330	straight to clear	sl. musty
222	.....	12.80	7.58	4.78	77	22	99	straight or better	O. K.
223	.....	11.82	9.74	4.58	231	66	297	straight to clear	O. K.

## SUMMARY OF RESULTS

Maximum .....	14.33	10.05	5.30	275	132	407
Minimum .....	11.27	7.02	.80	77	22	99
Average .....	12.66	8.42	4.04	186	72	258
Next to minimum.....	11.46	7.07	2.44	...	...	...

TABLE No. 2  
*Ash, Added Salt and Leavening Ingredients.*

Number	Cl as NaCl	SO <sub>2</sub>	Total P <sub>2</sub> O <sub>5</sub>	Ca O	Fe <sub>2</sub> O <sub>3</sub> + Al <sub>2</sub> O <sub>3</sub> Comb. P <sub>2</sub> O <sub>5</sub>	Available CO <sub>2</sub>	Residual CO <sub>2</sub>	Total CO <sub>2</sub>
111 .....	1.72	0.253	1.13	0.575	good trace	0.39	0.01	0.40
112 .....	2.00	0.019	1.39	0.533	good trace	0.52	0.04	0.56
113 .....	1.58	0.029	1.16	0.383	good trace	0.41	0.01	0.42
114 .....	1.97	0.023	1.33	0.419	0.042	0.48	0.01	0.49
139 .....	1.99	0.047	1.56	0.520	0.018	0.58	0.00	0.58
140 .....	1.90	0.032	1.21	0.385	0.032	0.40	0.00	0.40
162 .....	1.96	0.036	1.31	0.459	0.022	0.50	0.02	0.52
163 .....	2.33	0.194	1.24	0.524	0.032	0.61	0.00	0.61
164 .....	0.91	0.036	1.00	0.317	0.052	0.29	0.01	0.30
165 .....	1.66	0.036	1.31	0.394	0.043	0.48	0.02	0.50
166 .....	1.59	0.038	1.47	0.409	0.040	0.55	0.02	0.57
167 .....	1.41	0.036	1.43	0.529	0.067	0.59	0.05	0.64
168 .....	1.81	0.034	1.38	0.419	0.056	0.51	0.02	0.53
169 .....	1.61	0.040	1.32	0.454	0.061	0.31	0.04	0.35
170 .....	2.10	0.046	1.26	0.436	0.074	0.51	0.01	0.52
171 .....	1.83	0.055	1.38	0.506	0.065	0.56	0.01	0.57
172 .....	1.87	0.039	1.32	0.497	0.066	0.46	0.01	0.47
201 .....	1.80	0.045	1.44	0.469	0.047	0.59	0.03	0.62
202 .....	1.96	0.039	1.25	0.495	0.053	0.56	0.00	0.56
203 .....	1.91	0.030	1.56	0.449	0.058	0.54	0.00	0.54
204 .....	1.67	0.035	1.60	0.479	0.040	0.59	0.00	0.59
205 .....	1.59	0.043	1.03	0.335	0.041	0.35	0.02	0.37
206 .....	1.78	0.050	1.33	0.481	0.058	0.51	0.03	0.54
207 .....	1.89	0.030	1.31	0.494	0.039	0.65	0.04	0.69
208 .....	2.10	0.057	1.55	0.493	0.054	0.48	0.00	0.48
209 .....	2.16	0.053	0.87	0.319	0.037	0.64	0.01	0.65
210 .....	1.68	0.310	1.24	0.628	0.060	0.54	0.02	0.56
211 .....	1.71	0.037	1.41	0.513	0.067	0.56	0.02	0.58
212 .....	2.06	0.042	1.40	0.445	0.066	0.42	0.02	0.44
213 .....	2.24	0.026	1.34	0.404	0.067	0.51	0.01	0.52
214 .....	1.95	0.040	1.32	0.443	0.049	0.40	0.01	0.41
215 .....	1.86	0.014	1.28	0.446	0.046	0.48	0.02	0.50
216 .....	1.82	0.057	1.38	0.466	0.051	0.51	0.01	0.52
217 .....	2.48	0.064	1.74	0.511	0.065	0.51	0.01	0.52
218 .....	1.78	0.033	1.24	0.426	0.046	0.55	0.01	0.56
219 .....	0.059	0.019	0.407	0.060	0.031	0.00	0.00	0.00
220 .....	1.70	0.036	1.48	0.556	0.065	0.56	0.01	0.57
221 .....	1.85	0.045	1.49	0.554	0.049	0.56	0.00	0.56
222 .....	2.26	0.058	1.34	0.449	0.056	0.55	0.00	0.55
223 .....	2.25	0.053	1.29	0.477	0.046	0.46	0.00	0.46

SUMMARY OF RESULTS

Maximum .....	2.48	0.310	1.74	0.628	0.074	0.65	0.05	0.70
Minimum .....	0.059	0.014	0.41	0.060	0.018	0.00	0.00	0.00
Average .....	1.82	0.055	1.31	0.454	0.050	0.492	0.014	0.506
Next to Mini- mum .....	0.91	0.019	0.87	0.317	0.022	0.29	0.01	0.30



shows that alum was probably absent in all cases and the lime and phosphoric acid also showed that the acid leavening agent was acid calcium phosphate.

The high sulphate content of three of the samples indicates the use of "sulphonated phosphates" or phosphates to which calcium sulphate has been added. This is further shown by the high percentage of lime in proportion to the amount of phosphoric acid on the same samples. The average ratio of lime to phosphoric acid for all of the samples is .35 while for these three samples it is .42. The amount of available carbon dioxide found varied from a maximum of .65% to a minimum of 0% with an average of .492%. The amount next to the minimum was .29%. The residual carbon dioxide varied from a maximum of .05% to a minimum of 0% with an average of .014% (Excess acidity not determined in any case).

The above variations of determined constituents indicates a lack of standardization in the manufacture of these self rising flours, one sample being found which contained no leavening agents, the carbon dioxide being 0% and the chemicals producing carbon dioxide absent.

The character of the flour used in self-rising flour as shown by these tests is unsuited for the production of a satisfactory appearance of the crust and a uniform color. The color of the crumb was in every case unsatisfactory. Many being classed as dark gray while the character of the crumb was in general only fair. Of the flours examined less than half made biscuits with a satisfactory taste, all the others being either bitter, flat, or musty.

Since these samples, because of their varied sources and method of collection, may be considered representative, it would seem from the above study that

self-rising flours are generally made from lower grade milling products than the types of flour commonly used in bread making, and frequently from grades which cannot be properly designated as flour without qualification; also that the leavening ingredients used are, as far as this investigation has shown, acid calcium phosphate and bicarbonate of soda (in three cases containing added calcium sulphate). It also appears that these ingredients are mixed with the flour under unstandardized conditions so that uniform products are not obtained in the great majority of cases.

The objection to the use of these flours is three-fold:

1st. That through a mistaken sense of economy and an appeal to his sloth, the user is led to purchase an inferior product at the same price which would purchase a higher grade of flour and a baking powder which together would produce a better result.

2nd. That the consumer of these so called self-rising flours is using products which appear to be manufactured under not very carefully standardized conditions.

3rd. Instead of the nutritious yeast made loaf or carefully made biscuit marketed by the baker, the housewife using these so called self-rising flours is obtaining a biscuit which is often both unattractive and unpalatable.

### *Bibliography*

(1) Journal of Industrial and Engineering Chemistry, Vol. 14, P. 419.

(2) Journal of Industrial and Engineering Chemistry, Vol. 7, P. 807.

(3) U. S. Dept. of Agriculture Bulletin No. 839, Pages 3 to 5.

(4) Private Communication, National Cereal Products Laboratories.

### *Among Our Visitors*

EDITORS who want to know something about bread, in order to judge more intelligently propaganda articles assaulting it which reach their desks, now know where they can apply for immediate answers to all questions they may ask.

Five editors sent along inquiries during June, which happened to arrive simultaneously with an interesting group of visitors. These visitors were Public Food Officials, most of whom had records of keenly opposing dirty bakeries at some time in the past. But this time they came with hands extended in fellowship and eyes alert to see the baker at school, and the research chemists of the industry delving into its most complicated problems.

Among those who came in smiling and departed in a joyous mood that the baking industry had found itself and had set up its own standards before its membership and the world, were Hon. A. H. Jones, Food Commissioner of Illinois; W. P. Hartman, Food Commissioner of Michigan; I. I. Miller, Food Commissioner of Indiana; R. M. Black, Food Commissioner of Ohio; C. S. Prather, Food Commissioner of Missouri; Dr. R. E. Doolittle, Chief of the Central District of the Bureau of Chemistry, U. S. Department of Agriculture; W. S. Hoover, Chemist in charge of the Chicago laboratories of the Bureau of Chemistry; M. Brinsmaid, Chief Chemist of the Illinois Food Department; Wm. Geagley, Chemist of the Michigan Food Department; and R. D. Scott, Chemist Ohio Food Department.

At a meeting of these food officials, who have charge of enforcing weights and measures laws, regulating bakeries, and controlling the sale of bread, officials of the American Institute of Baking presented a review of its work and purposes. Dr. H. E. Barnard, business manager, told

of the research problems and service problems of the laboratories; Dr. Wm. C. Witte of the U. S. Public Health Service told of the sanitary surveys under progress in the industry; and Dr. C. B. Morison discussed the problems of the baking chemist.

Speaking for the Federal Food Officials, Dr. Frisbie and Dr. R. E. Doolittle pledged their full cooperation in the handling of all cases in which the baker was concerned which originated in interstate commerce. Each of the officials agreed to furnish us with reports of their sanitary inspections of bakeries, with all notices of prosecutions of bakers and analysis of bakery products. They expressed their intention of making a special study of pies and other bakery products which are now being considered by the United States Standards Committee.

Commissioner Hartman of Michigan told of the work of his inspectors in condemning 20,000 pounds of cookies, many of which were so covered with mold that their true character could not be determined, and which were about to be re-ground for use in making ginger cookies.

Inspectors Frank Hoey and C. G. Marley of the Illinois Food Department told of visiting the shop of an East St. Louis baker, who was selling two loaves for a nickle, and finding that the bread in question was made from moldy and wormy flour, out of which they sifted a double handful of worms to the bag.

There was no misapprehension on the part of any of the food officials present as to the inability of the honest baker to sell bread made from good materials below the cost of production.

These group state meetings, which are held several times a year, offer us a splendid opportunity for making valuable contacts with the officials who enforce all the laws effective in the bakery.



### *Our Cost Accounting Systems*

FROM all corners of the American baking world come tales of bakers who thought they were prosperous because they considered all money was theirs after bills had been checked out. Then somehow some unnoticed item sprang tiger-like out of a pile of bills and brought shock and disaster with it.

To meet the needs of the smallest baker equally with the largest, Former President Clifton N. Power and his associates drew up in 1921 the American Bakers Association's Money Saving Accounting System.

Any baker who keeps no accounts and is afraid he is too busy to start will find the Series A designed exactly for his needs. It is offered at \$20, is sent out for inspection and approval, with the privilege of returning it if found unadapted to the baker's plant, and is so simple in its operations that no bookkeeping knowledge is required to handle it. The charge made just covers the cost of printing and binding, to the American Bakers Association.

Series B is a cost analysis system designed for the baker who desires to learn the fundamental cost of production with a minimum of effort and time. It comes, like the others, in loose-leaf form with post binders and sufficient stationery to last for a period of from six months to two years. It requires a bookkeeper.

Series C is designed for the baker who has from 3 to 10 ovens and is desirous of going into detailed cost accounting.

Series D goes further into detailed costs and covers every refinement of modern bakery accounting and comparative data.

The instructions furnished with each set of systems are complete in every detail so they are readily understood and easily installed. The bakers who designed them

after great experience in the business and unselfishly placed them at the disposal of all, labored to perfect systems that would "give the baker a better insight into the conditions of his business, a firmer grasp on monetary affairs, and a better ability to demonstrate accurately how his business is conducted." We have these systems in stock, awaiting the interested inquiry of any baker. Many are already in use throughout the country.

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### *In Old Egypt and Richmond, Cal.*

THE departed shade, in old Egypt, was supposed to face a third-degree on his way to Heavenly pleasures, before all the Judges of the Way of Life.

To the Judge of Mercy, he cried out that he had not cheated the orphan; to the Judge of Fair Play he insisted that he had given true weight, and had not doctored his scales. And so it went, for about fifty appearances before the special assistants to Osiris, the chief judge.

F. Ketelhut of Richmond, Cal., is a baker who appears to be far from a mere shade but he has gone the way of a successful baker's life until he has some points about which he calls out with joy in the Independent, printed in Richmond:

"I did not give away any suckers.

I did not promise baseball bats.

I did not hoist the price of my loaf to cover premiums.

I did not stint on using milk.

I did not omit honey in my mix.

I did not refrain from rebuilding my bakery when newer ideas could be installed.

I thank you."

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### *Dusting Flour*

Once it was "Beauty and the Beast," but now in these days of vitamins it is "Beauty and the Yeast."

### Service Laboratory Work

SINCE the opening of the new laboratories in January of the present year to the first week in June our records show that over 1,800 samples of baking materials and miscellaneous technical supplies have been examined by our chemists.

Many of these samples required special study and the application of analytical methods far removed from the ordinary routine work of the laboratories. Others demanded special information not easily found in the average library. Fortunately for our chemists, the Institute possesses exceptional laboratory and library facilities for the study and investigation

of the wide variety of materials represented among these 1,800 samples.

The value of laboratory control can be easily demonstrated by making your problems known to the Institute. The time is rapidly passing when the basic materials of the baking industry can be sold to the baker without an analytical statement of composition. Buying in the dark will be as uncommon in the baking industry of the future as it is in the scientifically developed steel industry of the present. When the individual judgment and experience of the buyer are fortified by a laboratory report there will be little danger of exchanging good money for excess moisture and inert material.

## Reliable Milk Products

*As Registered, After Chemical Analysis, by the American Institute of Baking*

In common with other bread ingredients, milk and milk products should be of the highest quality when they find their way into the baker's establishment. To protect the baking industry from attractive labels which are not backed up by sound ingredients within the containers, the American Institute of Baking tested in its research laboratories samples of many brands of condensed, evaporated and powdered milk.

Not all brands were tested. The list printed below is a list of milks found to be reliable. The publication of this list is not meant to imply that other brands with which a baker may be in contact, are not reliable.

The work of making tests is proceeding and a supplementary list of registered milks will appear in the July number of Baking Technology. This list supplements the general list of registered products used in baking, which appeared in the February number.

Name of Product.	Manufacturer.
Sweetened Skimmed Condensed Milk.....	Boner & Co., Chicago
Cremora "A".....	The Dry Milk Co., New York
Cremora "CS".....	The Dry Milk Co., New York
Cremora "S".....	The Dry Milk Co., New York
Milcora.....	The Dry Milk Co., New York
Sweetened Skimmed Condensed Milk....	The Indiana Condensed Milk Co., Indianapolis
Merrell-Soule Powdered Half-Skimmed Milk.....	Merrell-Soule Co., Syracuse, N. Y.
Merrell-Soule Powdered Skimmed Milk.....	Merrell-Soule Co., Syracuse, N. Y.
Merrell-Soule Breadlac Brand Powdered Skimmed Milk.....	Merrell-Soule Co., Syracuse, N. Y.
Merrell-Soule Powdered Whole Milk.....	Merrell-Soule Co., Syracuse, N. Y.
Natural Skimmed Milk Powder.....	Natural Dry Milk Co., Chicago



## Books for the Baking Laboratory

FLOUR AND BREADMAKING. By R. Harcourt and Miss M. H. Purdy. Bulletin 285, Ontario Department of Agriculture, Ontario Agricultural College. A revised edition of No. 180, 12 figs. 48 pps.

This publication is, according to the title, a revision of an earlier bulletin, No. 180, of the Ontario Agricultural College. The subject of flour and breadmaking is presented in popular language, and the authors have steered clear of recent investigations in breadmaking from the biochemical colloidal standpoint as well as from late developments in the study of nutrition.

Essential statements on the influence of environment on the composition and varieties of wheat, and also a description of the milling process and its products are given in the first seven pages of the bulletin.

The quality of flour is discussed at some length in relation to the factors of "flour strength" and it is stated that, "Frankly, we do not know enough about chemistry of flour, or of the changes that the various constituents undergo in the process of breadmaking, to devise any system of chemical analysis that will give conclusive and satisfactory evidence of the strength of flour for breadmaking purposes. Therefore, the only available method of determining the relative value of flour for bread purposes is by actual baking trials." This statement of Professor Harcourt and Miss Purdy will probably find an agreeing echo in the opinion of most cereal chemists at the present time, but nevertheless there appears to be a good reason to feel that there is a strong possibility that the further investigation of the factors that control the physical condition of the wheat proteins, such as the effects of enzymes and hydrogen ion concentration will point the way to a more scientific determination of the baking value of a flour. The recent work of Ostwald and Luers, Mohs, Gortner, Bailey, Sharpe, and others may have a most important future influence on this problem.

In regard to flour bleaching Harcourt and Purdy state that "artificial bleaching will never make a flour equal in quality to that obtained under the ordinary conditions of aging. The chief advantage derived from artificial bleaching is obtained when freshly milled flour from wheat of a new crop has to be marketed at once, but

more especially if it has to be manufactured into bread without allowing time for proper aging."

Conditions which affect the keeping quality of flour are described and the importance of proper storage conditions emphasized.

The practical and not too technical side of breadmaking in the home is considered at some length from pages 16-36. Considerable information is given on yeast, compressed, dry and home made. Other ingredients of bread are discussed, and the effects of salt, shortening, milk, potatoes and sugar noted. The influence of temperature on fermentation, and the use of the thermometer are other topics. A simple cabinet for controlling temperature during the dough stage is described.

Other topics are bread judging, the preparation of baking powder biscuits, pastry and the composition of bread from different kinds of flour.

The nutritive value of white and brown bread is considered and the older literature cited, chiefly in regard to digestibility. The authors state that, "In this country where nearly every one eats a varied diet, we probably obtain a mixture of proteins, that is fairly satisfactory, and a sufficient amount of ash material to fully satisfy the human system without using the bread from the coarser flour for the purpose of obtaining these substances. Moreover, it is evident that the comparative nutritive value of white and brown bread varies with the individual." A table of the comparative nutritive value of bread and some of the common foods, on a calorie cost basis is appended.

C. B. M.

### Abstracts of Technical Articles

Selected from *Chemical Abstracts*, because of their special interest to members of the Baking Industry

#### Detection of Foreign Starch in Cereal Flour.

K. Amberger. *Z. Nähr-Genussm.* 42, 181-2 (1921). A method is described based upon the fact that diastase will hydrolyse wheat, rye, barley and oat starches, while corn, potato, and bean starches are practically unaffected. By destroying the first group and concentrating the foreign starches in a meal

under examination the subsequent microscopic detection of the latter is facilitated. L. D. Elliott.

**Sticky Bread.** A. J. J. Vandeveld. Reprint from 18e Vlaamsche Natuuren Geneeskundig Congres, Antwerp (1919), pp. 9-12.—The existing knowledge concerning "sticky" or "slimy" bread and the causative organism (a member of the *B. mesentericus* group) is briefly summarized. This thermostable organism occurs, not in the yeast, but in the flour, even when the latter is of the highest grade. Up to the present time there is no known way of destroying these organisms and only preventative measures can be resorted to. Chances of growth are diminished by substances which increase the acidity (e. g., sour dough, lactic acid, acetic acid), by long baking, preferably at low temperatures, by baking the bread as dry as possible, by rapidly cooling it after baking, by storing it in dry cold and by accelerating its distribution. V. V.

**The Influence of Relative Humidity and Moisture Content of Wheat on Milling Yields and Moisture Content of Flour.** J. H. Shollenberger. U. S. Dept. Agr. Bull. 1013, 1-12 (1921).—Experimental milling tests on hard wheats of various moisture contents showed that each 10 per cent increase in relative humidity above 35 per cent increased the total yield of the products obtained about 0.5%, and each decrease of 1 per cent in the moisture content of the wheat before tempering caused about 0.6% increase in yield owing to the greater amount of water which it was necessary to add in tempering these wheats in order to bring their moisture contents to the required percentage. No very pronounced relation between the moisture content of the flour and that of the wheat before tempering was shown, but a decided tendency was observed for the moisture content of the flour to increase as the relative humidity increased, a difference of 10 per cent in relative humidity making an average difference of approximately 0.5% in the moisture content of the flour. W. H. Ross.

**Detection and Determination of Fillers in Flour and Bread.** E. Vogt. Z. Nähr-Genussm. 42, 145-73 (1921). The fillers investigated were: Barley flour, corn meal, oat flour, "Weizen-nachmehl" and potato flours. Their microscopical detection depends upon a knowledge

of the form and size of the starch grains after cooking. It is facilitated by colorations produced with a diluted solution of Congo red in India ink (cf. Z. ges. Getreidew. 9, 44). V. has developed a method for determining the "true alkalinity" of the ash based upon the method of B. Pfyl. (C. A. 8, 2432.) The material is ashed with the addition of  $\text{Na}_2\text{CO}_3$  and the "true alkalinity" arrived at by determining the alkalinity of the ash after deducting the alkalinity due to  $\text{P}_2\text{O}_5$  determined titrimetrically. The average values for "true alkalinity" lie, for wheat flour, between -5 and -15 g. equivalents per 100 g. dry matter, for barley, corn and oat flour -20, and for potato products from -5 to +25, the potato flours being the only ones giving a very small negative value (i. e., a small actual acidity) or a positive value (i. e., an actual alkalinity after deducting for  $\text{P}_2\text{O}_5$ ). The "true alkalinities" of numerous mixtures are given. L. D. Elliott.

**Organic Foodstuffs with Specific Action.** IV. Gas metabolism changes in pigeons fed upon polished rice, with and without the addition of yeast to the diet. Emil Abderhalden. Arch. ges. Physiol. 187, 80-9 (1921). Pigeons were fed for two weeks on a diet consisting exclusively of polished rice and at the end of this period they presented the characteristic manifestations of alimentary dystrophy. During the period of the experiment body weight, temperature and gas metabolism determinations were made and curves plotted for the values secured showing a gradual fall throughout the course of the experiment. When yeast, or an alcoholic extract of yeast, was added to the diet a rise in the gas metabolism always occurred. G. H. S.

**White Bread Dyspepsia.** S. Fraser. Brit. Med. J. (1921), II, 1011.—Twelve cases of severe dyspepsia were traced to white bread. Substitution by a fine wholemeal bread was followed by return to normal. A. T. Cameron.

**Sanitary Control in the Manufacture of Foods and Its Economic Importance.** George Grindrod. Am. J. Pub. Health 11, 920-2 (1921).—A resume. N. Van Patten.

**Sanitation of Fruit and Vegetable Canning.** Harry M. Miller. Am. J. Pub. Health 11, 922-23 (1921).—M. describes various steps in the preparation of canned peaches, peas, etc. Nathan Van Patten.



# Washington's Call to Bakers

*It Is for Immediate Protest Against Agricultural Bloc's  
Drive on Baking Industry*

THE time has come in the history of the baking business when every baker might do well to say a word to his friends and customers about the Tariff and the Agricultural Bloc in Congress that now rides on a High, High Horse, and is aiming blows at the egg content of bakers cake, the almond fillings of almond cake, the desiccated cocoanut of cocoanut cake, and the shelled walnuts of walnut cake.

The Bloc, if its members have their way and carry out their various trades, will simply make the bakers of America vast collection agencies for heavy toll in favor of the marshaled and consolidated land speculators, walnut growers, egg growers, and almond grove salesmen of the Pacific Coast.

Sectionalism surpasses itself in the present tariff, making the baking industry the burden bearer to the Grizzly Bear State. And those from whom the money is to be collected in the form of vastly higher prices, are the inhabitants of all eastern consuming centers.

Eastern Senators and Representatives therefore should hear from the East—not from the Gold-go-getting West alone. It is timely to write them. It is, in fact, a baker's duty to the consuming public.

"The Agricultural bloc is riding us to

death in the Senate" writes one who watches the situation in Congress. "Unless eastern Congressmen shame them from their position, the Agricultural bloc will not be repudiated in favor of the consumer short of a general consumers' revolt."

The Bloc's aim is at all foodstuffs, whether raised in America or not, the idea being to drive consumers to American grown substitutes for each imported product shut off. Thus the duty of gelatin is to go up enormously to 20 per cent ad valorem and 7 cents per pound; on lemon oil it is to jump from 10 per cent to 30 per cent ad valorem; an increase of 200 per cent which cracker bakers will have to pay for a product of which California does not manufacture any appreciable amount.

The proposed duty on dried whole egg and crystal albumen is 18 cents per pound. The duty at present is 10 cents per pound and on crystal albumen it is 3 cents per pound. Thus the increase is 100 per cent on whole egg and 500 per cent on albumen. Consumers will be glad to know this when it results in added costs for cake; and when it runs the market for household eggs sky-high.

Is there ample cause here to protest? If so do your part.

## *The Bloc's in the Saddle*

*And Here's What It Is Doing to  
Bakers' Products*

Egg tariff increase . .	100 per cent.
Albumen increase . .	500 per cent.
Sugar increase . . .	100 per cent.
Gelatine increase . . .	300 per cent.
Lemon oil increase .	200 per cent.
Shelled peanuts increase . . . . .	400 per cent.
Shelled almonds increase . . . . .	275 per cent.
Shelled walnuts increase . . . . .	200 per cent.

And nearly every increase will stop the sale of bakers' cakes or make the baking industry a vast collection agency for California wealth.

AT

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association.*

Vol. I CHICAGO, ILLINOIS, JULY 15th, 1922 No. 7

## Cooperation in the Concrete

ANY BELIEVER in cooperation who wants to follow his faith with deeds will come, if he be a member of the baking industry, to Chicago September 11th. He will bring his wife with him if he believes she should learn enough of his business to know how to appreciate its problems and its opportunities.

There are so many reasons why every baker belongs in Chicago in Bakers World's Fair Week that no baker can possibly escape being pinned down by at least one of them. The biggest one is that cooperation can never be cooperation until bakers all over America come and actively cooperate.

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There can be no cooperation while 80 per cent of the bakers stay home and leave 20 per cent to shape all the policies and plan all the programs, and then the 80 per cent who never spoke up when they had a chance to spend the rest of the year finding reasons why they should not go along with the adopted program or help in any way to forward it.

If the bakers of America knew their best interests to-day

Congress would be flooded by reports from them on the meaning of the new tariff schedule to the baking industry. Instead of being alert on this issue and on express rate issues, most bakers leave the



few to carry the load,—and their inert criticism as well.

The answer to every problem afflicting the baking industry can be heard on the floor of the 25th annual convention of the American Bakers Association on the Municipal Pier at Chicago from September 11th to 16th. It was Theodore Roosevelt who said that every man owed the profession or trade he had adopted a certain percentage of his energy—this energy to be **spent** by that person in working for the improvement of his industry, his trade, or his profession and the pay he was to take was what the fond father gets when he sees his children go marching forward to success in life.

The baking industry is greater in recognition and higher in place in the respect of the American people to-day than it was ten years ago because certain bakers carried the banner forward. The writer knows one baker, who when there is trouble in some city between bakers, spends hundreds of dollars in long distance telephones to tell them that feuds and fights are easy—and cooperation and broad toleration of each other are hard. He works incessantly to bring them together and end their feud and then he goes about his business refusing even to hand in his bills for telephone tolls to the Association on whose Board of Governors he occupies a place of trust.

The writer knows another baker whose bakery became a pest center for molds. He washed it down with chloride of lime and washed it down again with lye water. And these things did no good.

Then he fumigated the plant and this did no good. He sent for chemists and they did him no good. He boiled all his pans and utensils. And this did no good.

While he was doing these things the American Bakers Association was also busy. It appropriated money and sent

it to one of America's greatest institutions of learning.

"Find out," this Association said to Dr. Samuel C. Prescott, head of the Department of Biology and Public Health of the Massachusetts Institute of Technology, "what causes mold, what cures it, and how to proceed to effect a cure."

Dr. Prescott went to work. He assigned the experimental work to two chemists and they worked until they had the answer to every problem. We have their report now. What are we doing with it? Hiding it away for only a few favored bakers to see, as any great baker's laboratory might easily do?

Not much. The American Bakers Association professes to be organized as a rallying point and a General Headquarters for the entire baking industry. It professes to see in every bad loaf of bread a potential enemy of baking progress.

The report is going through the printer's and soon it will emerge to be on call FOR ANY BAKER IN AMERICA at a trivial price. It is appearing serially in this magazine so that any baker can receive it here and get the benefit of its message to the industry. He can then make a work of minutes in cleansing any plant of a mold plague.

### *A Mold Exhibit*

And what did the baker do who had that affliction and fought it for months in vain? He became a regular dues-paying member of the American Bakers Association, and has this report on call so that the next time molds come he will be there with a fire-department that will end his troubles almost as soon as they have commenced. And it is the same with that other hot-weather affliction—the rope bacillus.

Do you want to learn all about these hot weather afflictions and see them, for

future identification, in every one of the forms in which they came blowing down on summer winds into your bake shop? If so come to your Bakers' National Convention and when you are here in Chicago come to your American Institute of Baking and see the mold gardens growing under the glass cases as nurtured by Harold E. Turley. Mr. Turley is a chemist who tends mold gardens as carefully as any tulip lover ever tended tulip gardens. He knows how to start them going, how to stop them and how fast all of the eleven principal different varieties can spread through a bake shop.

In his test tubes he can show you the spores and how they differ from the growing plants and how they wall themselves up against heat so that they live on when the plants themselves perish from too hot a temperature.

### *The Higher Margins*

Many a baker, in conversations with the writer, has assailed retailers for taking too high a margin on bread and has told how much higher it is than the margins they get on many other foods.

Well—bakers are toddlers yet in the arts of cooperation and talk much of the faith for each little deed with which they follow talk. Orange growers had a grievance like that five years ago. The writer heard them talking of it then. Next year he heard of experimental stores operated by the orange growers to work out on a laboratory basis just what was the ideal margin of profit to keep oranges moving at full speed, and still keep the grocer in the black side of his ledger.

The next year again the writer met a lecturer with a blackboard—sent out by orange cooperators to educate retailers. He showed them how 27 per cent profit would make them more money than the 58 per cent they were taking for the rea-

son that volume of sales was the true measure of profits, not margins.

And this year, just before he died, G. Harold Powell, the wizard of the California cooperators, was able to explain to the writer how he had indeed converted and convinced the retail world that volume of sales on low profit margins made them much more money than high margins.

### *The Good Will Fee*

G. Harold Powell was able to operate because every orange sold carried a little fee to go to the General Headquarters and there be turned into a fund to make a greater orange market. It was an infinitesimal portion of a cent per orange. But if a third as much per loaf of bread came in to these headquarters from each loaf sold in America we would be able to do wonders in creating new friends for bread and new markets for it. For two loaves of bread should be sold in America for every loaf now sold from bakers' ovens.

But the bakers who complain of retail margins mostly complain also of their National association and want the dues on a \$5 basis per year—just enough to pay the salary of their collector in a one-room National headquarters! How can bakers shed off the blinders that keep them from seeing the great Nation-wide tasks of their General Headquarters until they come to the National conventions and participate as self-respecting members of their own industry in the management of their own campaigns for the enlargement of their own industry?

### *Bakers Short Courses*

While the big convention is in progress on the big Municipal Pier the American Bakers Association will conduct short courses ALL FREE TO EVERY BAKER



in the American Institute's school rooms. These short courses will include every problem that any five or six bakers will signify they wish to learn about.

Think of your problem of special interest—whether it is accounting system, dough room problems, flour blending problems, or whatever it may be. Come to the Municipal Pier prepared to register and state it to the folks in charge of the American Institute's booth. Then you will be registered for the short course in your special topic and will be informed of the hour when the course is to be given. This isn't for members of the American Bakers Association alone. It is for every baker who sells bread.

### *Weights and Measures Round Table*

Officials from many states have been invited to Chicago for this momentous week for the bread industry. They will participate in a "round table" discussion of standard weight legislation and the experience of every state having such legislation in enforcing it. If you are thinking, as certain bakers in Wisconsin are, of aiming for a state-wide enactment on standard weights here is your chance to come and learn just how that problem has been worked out all over the rest of the American map.

### *Addresses On Our Problems*

Any baker can mind his dough in his own bakery but it takes one of America's great men, seeing clearly the important role of bread in modern life, to speak up so the great commonality of America will hear him.

For this reason the American Bakers Association has invited one of the greatest university presidents, one of the greatest leaders in the industry itself, one of the greatest statesmen in the President's cabinet, and one of the greatest scientists in

Europe to come here and address the members of the baking industry. Of course you will want to do your part at such a convention and you can see through to what such a series of masterful addresses will mean when their message is broadcasted through the newspapers as they never could be in any other manner of bringing them together.

### *Convention Program*

Here are the tentatively sketched convention events, having to do with formal meetings themselves. Of course the great Municipal Pier with many booths filled with bakers machinery in full operation will furnish the principal center of education and interest, and the source of new ideas which the progressive baker can carry home with him to try out.

#### *Monday, Sept. 11, Registration Day at Pier*

10.30 A. M. Meeting of Pie Bakers Association.

3. P. M. Meeting of Board of Governors, American Bakers Association.

Evening—General Entertainment with many free features on the pier itself while the Machinery Exhibit is in progress.

#### *Tuesday, Sept. 12, Conference Day*

Conferences at convenient rooms on the pier of bakers from each state, of regional association members, of pie bakers, of members of the National Retailers' association, of cracker bakers—the general "get-together-and-get-acquainted" day.

#### *Wednesday, Sept. 13, General Convention Opens*

10.30 A. M. General convention in pier assembly room with three speakers of National prominence in public affairs or within the baking industry. Meeting to close at 1 P. M.

3 P. M. Meeting of Board of Governors of the American Institute of Baking at the Institute headquarters, 1135 Fullerton Ave. Bus service will keep the Institute in constant touch with the convention.

6.30 P. M. Mass meeting of the Allied Council on the pier with B. B. Grenell in the chair; the purpose being to draft plans for the advancement of cooperative effort to expand sales.

8 P. M. General entertainment with many attractive features for all convention visitors.

### *Thursday, Sept. 14, Institute Day*

10.30 A. M. Program at Mass Convention of Scientific speeches dealing with the advance of the baking industry. Speakers will include scientists of National and international fame.

Afternoon, and Evening: General conferences and entertainments.

### *Friday Sept. 15, Association Day*

10.30 A. M. Mass convention in which members of the baking industry will have a chance to learn what their National association has done and is doing for the industry, and how they can cooperate to the best advantage to enlarge markets for baked products.

### *Saturday, Sept. 16, Allied Trades Day*

10. A. M. Meeting of the Allied Trades at the Old Colony Club, Hotel La Salle, with conferences, excursions and a general good time to fill out the affairs of the day and the convention.

This is the program. Where is the baker who feels he can afford to stay away?

### *Special Low Rates*

Do not forget that rates of one-and-one-half fare for the round trip have been granted. To get the benefit of these rates

you must ask for a certificate when you buy ticket to Chicago. On presenting this certificate at the transportation booth at the Municipal Pier you can obtain an order for a ticket home at  $\frac{1}{2}$  the regular fare. This applies to your own ticket as a baker and the tickets of all who attend the Exposition with you whether bakers or not.

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### *Find Substitutes are Fewer*

THE Chicago Station of the Bureau of Chemistry, U. S. Department of Agriculture has completed an investigation of the business done recently by bakers supply houses. It found that SUBSTITUTES for standard materials were losing ground everywhere and the GENUINE MATERIALS as nature built them were being restored to baked goods.

The investigation developed the fact of IMITATION goods the principal sales still being made were in imitation jellies, jams and preserves, cheap cocoas and imitation extracts. The imitation jams and jellies proved on investigation to consist of half waste apple base and glucose, agar agar, coloring matter and phosphoric acid.

The investigators found that saponin was disappearing as an ingredient in whip powders. They discovered one manufacturer putting out 300-pound drums supposedly filled with "egg colored cake mixture." The colored mixture was discovered to be composed of returned and ground cake crumbs, lard compound, powdered buttermilk, corn starch, invert sugar, salt, nutmegs, ginger, and flour.

Ask any baker who ever turned to substitutes after using genuine fresh ingredients, how fast his trade followed the loss of the appetite call to other quarters. Quality goods in baking, he will tell you, will build up our industry.



### *The Need to Fight*

ANYONE who knows the punishing power of a modern mixing machine knows that if a mouse, by any rare piece of ill luck, got mixed up in a dough batch going through one, would come out in very fine bits. And could not be recognized as an intact mouse at all.

For every genuine case of complaint about a misfortune such as was featured in the Hearst newspapers recently there will be a hundred cases of fakes and attempts at blackmail through seeking a suit for alleged damages.

David Starr Jordan, a noted man of science, once answered a question as to how many grafters there were in the world. His answer was that there were as many grafters as there were chances to graft.

Probably every man who ever paid graft in a way to give out the impression that there was more "where that came from" knows how the would-be recipients flock around.

A big baker in the state of Texas has already had an experience based on the idea that damage suits would be settled rather than fought out. He was served suddenly by summons in a suit alleging that a certain William McGaffery had found a mouse in a piece of bread served to him in a Texas restaurant.

Instead of becoming hysterical with fear this baker wired to New York to have the Rogues Gallery looked over for the complainant's name and picture. Results were very speedy, for the baker rightly guessed that a man daring enough to attempt such blackmail would have a past worth digging into. It was found he was fingerprinted and "mugged" both and had a dishonorable discharge from the Navy. Nothing more was ever heard of the suit.

Another baker, famous for his fresh pies, was suddenly confronted by a court claim that a man and his wife had been poisoned after eating an egg custard pie covered with meringue, purchased at this baker's retail store on a Sunday morning and eaten at 4 o'clock that afternoon.

The baker fought the case for he knew two things—first that he had never put meringue on top of an egg custard pie, and second that he had never sold a custard pie on a Sunday as he invariably sold out his supply on Saturday evenings.

The gold-digging pair could not hold up their story in court and were "pizened by their own pie story" for the jury just "passed them the razzberries" as one of the jurors put it. The baker was in one way fortunate.

Always a believer in honest materials he had bought only fresh eggs from a nearby farm, and fresh ingredients of the highest character. He was able to call in the salesmen selling him all of his products and to have them testify, with receipted bills to back them up. All in all the trial gave him a standing in his town that could not have been won in any other way. And the sales of his pastries were deservedly increased.

These two bakers advise all of the industry's members to stand and fight—to keep plants they can afford to fight for, and make the fight every time would-be blackmailers assail them. A notification to this headquarters in case of any suspected blackmail will bring the entire resources of the American Bakers Association into play to protect any threatened corner of it.

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### *A Change of Front*

Universities once scorned the bakers. Now eight of the greatest of them offer advanced degrees for research into baking problems.

### *A Letter to Collier's*

WILL somebody please page, for the benefit of Dr. Woods Hutchinson and Collier's Weekly, Mr. Average World War Veteran, and ask him how much he enjoyed the product of the field bakery that followed him to the front line area?

And will somebody please page, also, Mr. Average Veteran of the Spanish-American war who got no bread afield but had to live on hard tack and "Corned Nag" as he called the preserved beef that made the greatest scandal of the war?

In the opinion of the present writer, who still remembers the joy which he plunged into a loaf of delicious bread, after weeks and months of starving on "canned nag," the great difference between the fine physical condition in which the unwounded boys came home from France and the state of emaciation that marked the break-up camps of the Spanish-American war, was due to the American field bakery.

It won its way in the world war, and no soldier will ever again want to be without his daily bread in spite of all the precious doctoring of facts that Dr. Woods Hutchinson can concoct.

Have you, as bakers, had your say yet to Collier's about its assault on bread in which it proposed as a "meaty" slogan, "eat less bread" for the National consideration? D. A. Anthony of the Anthony Baking Company, of Rochester, N. Y., has had his say, in pithy style, and this is what he said:

To the Editor of Collier's Weekly:

Although I am a baker and the son of a baker, which may seem to make me prejudiced, I firmly believe in the truth of the statement, "Bread is your best food; eat more of it."

The reason I believe this so thoroughly is that I practice what I preach. Bread is and always has been the chief article of

my diet. I eat PRACTICALLY NO MEAT and very few vegetables, although I do eat plenty of fruit and drink much milk.

Dr. Woods Hutchinson to the contrary notwithstanding I think I have "fire in the belly and courage in the heart," enough so **at any rate to welcome an investigation** by him or anyone else of my diet to prove that bread is my chief food, and that I decidedly am not "a down-and-outer" or "weak, lazy and easily discouraged."

Probably the article about this "most unwholesome cereal" was merely printed **to fill space**. If so you might send one of your correspondents to interview me, take some pictures, and feature me as as "the human wonder who lives on bread." However I think you will find if you investigate a little further that I am not unique **in this respect** and that "Bread is indeed your best food."

It is bakers like Mr. Anthony who are carrying the banners of their industry forward. We will all be mobilized and marshaled as an industry when the National Headquarters of the industry is indeed a G. H. Q., with legionnaires like him in all quarters of the field.

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### *"Our Little Sister"*

RARE among little girls is Evelyn Turner, the Southern child who smiled after her leg had been taken off by the surgeons in a Georgia hospital. The members of the Allied Trades, who adopted her as their "little sister" at the Savannah Convention, just because her story touched their hearts, have sent her many little presents such as dolls and toys.

"Daddy" Steele, otherwise O. L. Steele, whose address is at the Piedmont Hotel, Atlanta, Ga., writes that he took "little Evelyn out to an ice cream treat and a picture show" one night recently and found her as happy in the possession of her new toys as ever a child could be. And some say industry "has no heart"



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entry in the post-office at Chicago, Illinois, as second-class matter, applied for under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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JULY 15, 1922

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### *The Gathering Clans*

WHAT the ancient Council Bluffs were to the Indians who once roamed the plains where Jay Burns now operates his Omaha bakery, the Municipal Pier at Chicago will be to the baking industry in September.

There will come to the meeting of the baker clans every man who has the welfare of the industry at heart. They may have many points for acute difference among themselves. But the important thing is that they will bring their differences to a melting pot out of which common understandings and common purposes can emerge as the things for all to fight for.

The effort of members of the American Bakers Association to work together as members of a marshaled industry will not be a perfected effort for many years to come. Some will always think others do not "track" just right with their fellows. But the big

thing about the Chicago meeting is that all will get there one way or another. And all will go away with a clearer vision of the work that lies in front of our National headquarters.

### *The Eau Claire Way*

UNTIL June of this year the bakers of Northwestern Wisconsin had never felt the pull of any problem they could not work out except by associating together in a neighborhood organization. Each had been sufficient unto himself.

But J. H. Phipps found that while in some towns there were standard-weight laws, in other towns there were none. And that the people were becoming wrought up at a multiplicity of prices.

In vain he demonstrated to his customers that his loaves were three and four ounces heavier than loaves sold in other towns at lower price. The pressure was always upon his back "to meet the other fellow", even when an attempt to do so carried him into the red of the ledger.

At last Mr. Phipps wrote to fifty or more bakers in the zone between Milwaukee and Minneapolis. Would they like to meet together and see if they could organize?

They did meet—a bold band of pioneers from eleven cities—and

they formed the Northwestern Wisconsin Bakers' Association. The very next step was to plan for a picnic in September at one of the lakes for which Wisconsin is justly famous. It is bound to be a popular picnic. Similar neighborhood meetings in eastern Pennsylvania, in western Pennsylvania, in Nebraska, in New England make the backbone of the newly-born spirit of co-operation within the industry. We wish the Wisconsin bakers well, if for no other reason than the selfish one that every bit of getting together leads to just a little bit more.

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### *Research—and its Results*

**B**EFORE the members of the Agricultural Bloc demanded huge tariff increases on bakery products, experts retained by the National headquarters of the various industries involved intensively studied the bakers of the United States.

They figured out just how much an increase of 10 cents a pound on raisin cake would slow up the sale of such cake. They figured out down to the last orange the slack-off in sales to be expected as prices mount. In seeking to load down bakery products with all the tariff the traffic will bear, they have skillful experts to tell them where the overload begins. And to warn

them off the shoals of a bakers' revolt.

Does any baker believe he knows the California cooperatives half so well as the California cooperators know him? John Hartley, who is twice as good a philosopher as he is anything else in this world, believes that he knows them a little bit. And this gives much weight to a suggestion of his. It is that the day may come when every baker will have to wrap up in every loaf of bread he sells an appeal to eastern food consumers to be on their guard against the new variety of west-coast gold diggers. He suggests that unless the people of the east rise up against the new tariff the gouging will go right on, and a New Sectionalism with all the issues that go with Sectionalism will arise within our midst. This is an important forecast. The Agricultural Bloc members might do well to give it heed.

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### *Birds and Prosperity*

**A** BAKER peculiarly dependent on the prosperity of the United States is Horace Crider of the Homestead Baking Co. When the steel mills shut down all America suffers indirectly for it means that modern construction work is slack. But Horace suffers most directly for a shut-down to him means the loss of a great trade in



bread baked to fill workmen's dinner pails.

Horace can tell about how business in the steel mills for when the workmen throng the plants the birds fly thickly overhead. They foregather toward the mills to pick up crumbs from dinner pails.

In the Spring we met up with the genial philosopher of Western Pennsylvania and he spoke much of the work of cooperation bakers must undertake. But there was a note of sadness in his voice: the birds were not flying at Homestead.

We met him again in July. This time he talked much of cooperation and of bakers' problems he wanted to see straightened out. He had a tone of gladness in his voice, the birds were flying again, all right. And we could see it for ourselves—giant smoke stacks out of which belched the breath of a new American prosperity. We knew by the smoke that the worst of the post-war slack had passed. And Horace knew by the flight of the birds above the smoke that trade in his bread would flourish.

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### *What We Vision We Fulfill*

NO man can have observed much that goes on in this world without coming to realize that anything mankind can vision men can perform. The wildest

dreams of yesterday are the commonplace events of to-day, as we can observe all around us, even if we look no further than to the prices now obtained for eggs, watermelons, apples, oranges, raisins, canned goods, and even wheat, compared to the days before producers began to cooperate.

"Why didn't you let us know about that before" said members of a group of New England bakers who had resigned their membership. They addressed a spokesman for the baking industry who had reported on the work done to obtain equitable tariff schedules, fair express rates, favorable state and national legislation, and to spread thick upon the American consciousness a good name for bread.

They had heard rumors—all of them silly. They feared some big baker was going to get the results of research work in our laboratories. Does the work on molds now being published for all in this magazine look like there was any secreting of results?

Our work is for the industry,—for all its members. All that is lacking is a comprehension of this in its fullest meaning, and when enough conventions meet with enough open discussion of affairs this lack of vision will be remedied in favor of higher powered drives ahead for results. Then we will come into our own.

## *Who Should Join?*

WHEN we find a baker who in all good faith says the dues of his national association are so high he cannot join, we feel that he has voiced a real problem.

This year—from January to September, 1922—is a period of glorious pioneering in which bold adventurers could try out new plans. Starting this magazine was one of them. Opening a baking school was another. Demanding that Federal officials stop, look, and listen to members of the baking industry on bakery affairs was still another.

Working for cooperation between flour men, machinery men, supply men, and bakers was still another task that fell easily into our hands. When Dr. H. E. Barnard went to a meeting of millers and they in turn told him they thought it was time to advertise bread in order to increase its sales in order to increase the use of flour, they bespoke the 1922 brand of cooperation.

But bold pioneering must be followed by real and constructive cooperation with all taking a hand. Every baker who believes he knows some way to combine low-cost dues with an adequate National budget and a large membership will speak on a vital problem if he lets his voice be loudly heard in September.

## *A Victory*

FOR years the government has appointed committees to tell the baking industry what it must do. This year it heard from the consolidated and concentrated power of American bakers, speaking from their National headquarters, when the Department of Agriculture started to set up certain standards, through its Bureau of Standards.

Result? For the first time in the industry's history a CONFERENCE committee was appointed to canvass the opinion of the industry's members. The new measure will be just and fair when it emerges in the form of regulations worthy to be obeyed.

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## *And Another Victory*

EXPRESS companies raised rates to bakers in 1918 and did it again in 1919 and still again in 1921. They thought the going was so good they could do it again in 1922. But they encountered in a head-on collision the bakers' own fighting organization as developed at its new National home. Read on the last page of this magazine how the special express rate committee of the American bakers association obtained a suspension of pending raises in express rates on cake and also obtained an investigation of express rates in general.



# Research on Bakers' Costs

*As Carried Forward at Leland Stanford University by the Food Research Institute*

THE Food Research Institute of Stanford University, established in 1921 by the Carnegie Corporation of New York, has begun to study some of the economic problems of the baking industry. Possibilities of economic research in this field were discussed at the last convention of the American Bakers Association, in papers by Harry D. Tipton and the writer. Bakers present at the discussion expressed a favorable attitude.

Subsequently the executive committee of the association appointed a Committee on Economic Research, consisting of Mr. Tipton, A. L. Taggart, and W. E. Long, whom the Institute may consult in the prosecution of its studies. Several bakers have generously assisted in some preliminary inquiries, and others have given assurances of willingness to supply data for confidential study.

With this assurance of support from within the industry, and anticipating that further support will develop as the work progresses, the Food Research Institute has set on foot an initial inquiry into one of the troublesome problems of the baking industry. Questionnaires on losses from stale bread have lately been mailed to 150 representative wholesale bakers. The In-

stitute seeks thereby to assemble a body of information sufficiently comprehensive to enable it to reach sound and significant conclusions upon this important point. Bakers who did not receive questionnaires, but who desire to contribute from their experience and share in the summary of results may obtain blanks from the Food Research Institute, Stanford University, California.

Information obtained from individual plants will be assembled and analyzed with care with a view to arriving at conclusions of general validity. The reports will be treated as strictly confidential, and will be summarized in such a way as not to reveal individual positions or opinions. In this way it is believed that the experience of the industry upon certain

points can be effectively pooled for the common welfare, without doing violence to the natural reluctance of business concerns to share intimate details of their business with their competitors or the public.

As an integral part of Stanford University, the Food Research Institute is independent of trade or government affiliations, and has no commercial aim in view. It is founded for the scientific, unbiased study of food problems, in the interest of

## *Your Important Part In Helping Research Work Succeed*

Until bakers thoroughly learn to co-operate they are likely to consider as intrusions the "nosey" questions put to them about their business by certain men they consider "outsiders."

By just such questions the raisin growers' general office learned how to launch campaigns that now bring in 18 cents per pound where 4 used to be considered high.

Research work is behind every modern drive in industry on the new policy of working in unison to saturate a food market rather than quarreling over the division of already developed fields.

The bread market will never be "saturated" until every baker sells at least two loaves of bread to one he now sells.

producers, distributors, and consumers alike. Its success will be judged by the soundness and significance of its conclusions. Its progress in certain directions will be greatly facilitated by the assistance of business concerns in supplying essential data not generally accessible, and it appeals for this assistance with the intention of justifying any confidence reposed in it.

The Institute therefore bespeaks the cordial and interested cooperation of the American baker in this initial inquiry and in others which may follow, and it desires to emphasize the fact that the results will be in direct proportion to the response which he gives.

JOSEPH S. DAVIS,

Director, Food Research Institute,  
Stanford University, Calif.

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### *From a Visitor*

PREVIOUS to my visit I had a very vague idea of the American Institute and its workings. I was not only surprised but amazed by its magnitude and the scope of its work. If the bakers of the whole country could visit the Institute, see its possibilities in winning friends and respect for the industry. I firmly believe our membership would increase very rapidly.

W. P. WALSH,

Walsh Baking Co., Evansville, Ind.

Well it so happens "bakers of the whole country" can see the plant here that concentrates and handles as near to every National problem besetting the industry as its staff can measure.

All the bakers have to do is to come to the Bakers World's Fair to be held on the Municipal Pier in Chicago, in September.

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### *Your Bakery's Score?*

WHAT better thing could be said of any baker than is said of Gordon Smith in Mobile? This is that his bakery is the

largest in the United States **in proportion to the population served.**

Gordon Smith through active interest in public life taught his neighbors that he was a trustworthy citizen. Through fair treatment of his workers he made them happy and glad to speak well of his products. Through quality bread he made each loaf sell its successor. He changed with the times, building an old wooden plant over into the most modern in his community. What other routes are there to success?

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### *The Little Baker's Hope*

THERE is one generalization in connection with the development of trade organizations that has been overlooked for the most part. The Trade Association in membership is predominately made up of the smaller establishments. Big business can employ its own agents in all these matters. It can establish its grades and standards, it can employ its own research laboratories. Little business can only hope to be equally informed and make equal effort to promote its welfare through trade associations.

—From an Official Summary of the Proceedings of a Conference of Trade Association Representatives held under the Auspices of the Department of Commerce at Washington, D. C.

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### *Flour—and Flour and Dues*

A MICHIGAN baker was sure he could not afford the dues of the American Bakers Association. But his flour gave him much trouble and he sent in samples. He found them so far below what the labels told him he was getting that the flour mill quickly settled in cash. The sum received was five times his dues for one year. Now he pays with a smile.



# Toast, Bread and Orange Juice

*And the Way National Perspectives On Advertising Increase  
their Use Many Fold*

IF EVERY wheat field developed suddenly the barberry plague or a flood should overwhelm all river valley acreages the bakers would not, of course, go down alone. With them as fellows in disaster would go down to trade ruin the sellers of bakers' supplies, of flour, of machinery, of yeast, of wrapping paper, and quite a few other things.

Flour men recognize the interdependence of all branches of the bread-making industry and talked at their Kansas City convention in June of a new kind of National advertising campaign. It was not to be aimed at the bakers, asking them to use more flour, or flour of one brand in preference to another. Instead, it was to be aimed at the housewife asking her to depend more steadily on bakers' bread.

The millers looked across the baking industry to the millions of women who still bake their own bread, and to the sales of flour that will follow the raising of the baking industry from seventh to fifth or fourth place in the industrial world of America. They talked of an educational campaign to make the bakers' fine quality loaf known in every reachable home where suspicion and resentment against it still lurk.

Yeast men see the same vision and at the Pennsylvania State Convention one of them gathered his associates about him at a table and instructed them in the tasks of releasing 60,000 street-car advertising cards in almost a hundred western cities. All were addressed to women and carried on in behalf of bakers' bread.

Machinery men, flour men, yeast men, supply men, bakers—all who succeeded

when the baking industry succeeds and who fail when it fails—are working together to make the Bakers World's Fair at Chicago next September the greatest expression of their cooperative spirit the world has known.

Who is there that does not owe himself the treat of being present?

And if their National advertising campaigns develop as they plan, the folks interested in making the baking industry succeed will only be doing what many other successful industries are doing.

Walnut growers found themselves last year with millions of pounds of walnuts and few orders. They shipped walnuts to warehouses in short-range striking distance of every retailer, instead of waiting for orders. Then they advertised—created a demand that came dribbling into every store. And right behind it was their salesman urging the store to buy—a week's supply at least.

They returned the growers more money for that crop than any other ever marketed. And at the outset of the campaign the growers had been totally discouraged. It paid to pull the public to the product.

Orange growers found synthetic orange juice going out over drug store counters, and found the chief reason was that it took too long to cut up and squeeze an orange. They developed an electric machine to do the work—sold it at cost—and tremendously increased orange sales.

In the National Headquarters of the Baking Industry something very similar is under way. A toaster is being developed suitable for sale at a price that will put it in every home that has an electric socket. And then a "toast for break-

fast" campaign will have a different meaning from what it had when making toast was too difficult to tempt most of the late risers or any of the early ones. The cooperative spirit is increasing.

The part in it of the American Institute of Baking is to develop a low-cost toaster, get it into the hands of every bread user, and convert him to toast as a breakfast food. Our friends will hear much more of this particular problem as plans and work develop.

### *Underselling Up in Canada*

WHAT are the problems that mostly beset the bakers of Canada?"

The question was asked in Bedford Springs, Penn., where leading lights of the world of baking had assembled from all corners of the globe. The Pennsylvania bakers had been telling their troubles from the floor in platform speeches.

A prominent official of the Canadian Bakers Association had only the chance to tell his in friendly little chats that are so delightful a feature of any well-managed convention week. "Our chief trouble up in Canada," he said, "is that sometimes flour goes up and some one baker will find himself 'long' on cheap flour, while his competitors are 'short' and have to buy on the advance.

"The fortunate baker with this sudden advantage on his side may have some old grievance to work out, or may enjoy the sheer love of riding down an unfortunate competitor. At any rate, he often refuses to meet his competitors and goes on underselling them until they are ruined or nearly ruined.

"I have watched this thing year in and year out. The man nearly ruined this year learns his bitter lesson and next year in the period of low flour he stocks up more heavily. Perhaps he gets the

chance now to 'run his competitor' on the first sharp advance, and you would think he would see the folly of it and work for a better day. But he seldom does. With all the joy of a college sophomore in running a freshman around, he starts in to bedevil his competitor. And thus about all the profits of the baking industry are dropped at one time or another.

"If we had some way of getting over these disastrous trade wars, and had some center for research such as your American Institute of Baking, we could perhaps get on vastly better than we do. I am trying to get our Canadian bakers to establish a center for research at the college at Guelph. If we can get it anywhere near as good as yours at Chicago we shall consider ourselves fortunate.

This baker's view had all to do with Canada and nothing to do with our States. Yet where have you heard some little story like that before? It has been told in a little town like Crete, Neb., over the hill in Hastings, up the Platte in Grand Island, down in Texas at Galveston, and up in New England in every nook and cranny of our land. The way to co-operate is to march together and let the mass spirit of a convention take the place of the Individual gloating over power with its use often to harm one's neighbor and the Industry as a whole. This is only one of the many situations you can help to cure by being present and AGGRESSIVELY PRESENT at the National convention and great Machinery World's Fair at Chicago in September. Canada is finding the way to marshal her industry. So can we.

I have gotten more real good out of the two issues of Baking Technology you sent me than out of all else I ever read.

HOWARD ROBINSON,

The Coshocton Baking Co., Coshocton, Ohio.



# Finding the Source of Molds

## *How Research Chemists Went About This Task*

### PART II

A Report of work done for the American Institute of Baking by J. W. Strieder and R. N. McClellan under the direction of Dr. Samuel Prescott, head of the Department of Biology and Public Health of the Massachusetts Institute of Technology.

**I**N order to determine the possible relation between sanitary conditions and the prevalence of molding, sanitary surveys of a number of bakeries in Greater Boston have been made.

In undertaking this portion of the investigation, a number of bakeries that would be representative of the diverse conditions likely to be encountered in the industry was selected. Through general acquaintance with several types of bakeries that seemed to be representative, and by the simple expedient of consulting the telephone directory and making a reconnaissance of the places listed, it was possible to locate a number of concerns suitable for our purpose. The types selected, nine in all, were (1) a "system" bakery; (2) an Italian cellar bakery; (3) an Italian model bakery; (4) a suburban American bakery; (5) a "system" bakery; (6) a large modern scientific bakery; (7) a smaller scientific bakery; (8) a small city-store bakery; (9) an inferior French city bakery.

A sanitary survey was made, covering all the points listed in the score card, and the bakeries rated on a basis of 100% as perfect. Some difficulty was experienced in rating the different establishments, due to almost negligible shades of incongruity when comparisons of the points in question were made. But by assuming an absolutely unbiased attitude and by constantly revising the different scores assigned, what is believed to be a fairly accurate decision in all cases was reached. The scores are appended. A brief descrip-

tion of each may be useful to students.

(1) A "system" bakery, was located in the heart of a business section. On one side was a quick lunch room, on the other a tobacconist. The rear of this bakery gives on a dirty court yard, moderately strewn with rubbish. Here nearly twenty refuse cans, containing refuse material from the lunch room, next door, stand exposed to flies—except in the case of those few cans which are adequately covered. A sewage drain in this court yard is located nearly at the back door of the bakery and, while it was indeterminate as to whether or not it is systematically oiled to prevent nuisance, it gave off an offensive odor on the day examined. The shop itself was above ground, fairly well lighted and mechanically ventilated. Doors were screened, windows kept closed and the shop surprisingly free from flies, considering the obvious fly nuisance presented by the insanitary condition in the court yard behind the shop.

Walls and ceilings were below par in cleanliness, the walls being of corrugated metal, whose paint coat was nearly covered by a fine settling of dust and flour particles. The floor was of wood, very clean, well kept and water tight. No water closet nuisance was observed, but a sink, exposed and rather dirty, for general washing purposes, was exposed in the open rear shop. Plumbing satisfactory.

The employees were neat, uniformed, clean in person and on the whole very excellent. The personnel consisted of four

girls, one baker, and one negro worker who was not quite up to the standard of the white help.

Utensils, mixers, dough racks, etc., were only moderately clean. Raw materials were stored in an anteroom, which, though clean, well ventilated and floored with cement, was open to the rest of the shop. Here the materials were poorly covered and on the whole negligently stored. Observations on handling of products during manufacture were only moderately satisfactory, although handling of the final product was perfectly so, except that the bread was wrapped only at time of sale.

(2) An Italian cellar bakery. Poorly lighted and ventilated and representative of the lowest degree of sanitary excellence. Located in a district heavily populated with foreigners and on a street crowded with their shops, clothing stores, etc., typically dirty and congested. This shop has a U-shaped floor plan with one leg of the U abbreviated, thus more resembling a J, and leading to a door beyond which we were not permitted access and beside which leaned a shot gun.

Shop screened but only fairly free from flies, due to their abundance in the vicinity and the constant entering of customers through an ill-fitting screen door. A small basement window on the left side of the shop looks out at ground level upon a filthy alley and while this window is screened, more or less adequately, air currents may bring in dust and dirt. Plumbing exposed and wrapped with rags and a fairly clean sink exposed in rear. Lavatory compartment where sink is located lacks glass in its window frame.

Employees clean, and apparently healthy and noticeably neat in their work, but not neatly nor cleanly clad. All utensils fairly clean, some very much so, and, considering the fact that there is

no mechanical equipment, except a mixer, the product is handled very satisfactorily during the process of manufacture. The final product, however, is exposed to flies and handled considerably by customers.

Only one or two ovens was in use and in the firebox of the idle oven, showing that it had not been in use for some time, were several old, hard, moldy loaves of bread. These had apparently been tossed in there to be out of the way. The mold spores from this source might readily be conveyed, by flies or air currents, to infect fresh loaves. Cobwebs were fairly profuse in the far corners of the shop. A barrel of water was standing in rear shop. Flour was stored fairly satisfactorily in the more distant short leg of the U. This part of the shop, however, was moderately dirty and very dark when not artificially illuminated.

(3) A model Italian bakery. Sanitary conditions here, especially in view of the location, which was approximately the same as No. 2, were very excellent. Proprietor and employees were neat, clean, very much interested in our work and courteous and obliging. All equipment was new and the shop installed in a remodeled store where floors, wall sheathing and ceilings were new and freshly painted.

The only objectionable feature, beyond limitations imposed by location and class of trade, was lack of proper screening with its consequent bad exposure to the fly nuisance. This feature, however, was remedied at once by the proprietor as soon as the screens, then already ordered, were delivered to him. Protection of goods before screening the shop was not satisfactory, due to exposure to flies, but now this is entirely satisfactory.

It is notable that, since screening and under conditions otherwise identical, the



mold growth on material from this shop is less abundant and less rapid.

(4) A suburban American bakery. The proprietor is a man interested in the application of science and scientific methods to his industry and his interests are in the whole baking industry at large. The establishment is a general bakery and caterer's shop.

Our studies here are previous to the installation of modern mechanical equipment, which the proprietor plans to effect within a year, and since present methods and equipment are rather old, it will be interesting and valuable to check up again on the effect of the new methods and equipment upon mold growth.

Walls were half sheathed and moderately clean; floor sprinkled with sawdust and moderately clean; ceiling very high and clean. Lighting was good and screening excellent. Trays were moderately clean and lined with clean new paper. A sink in the open shop was rather carelessly littered and only moderately clean. Overhead in the middle of the shop were suspended two long planks (of the type used by caterers for banquet tables) which were dusty and on the upper side and might well sift down dust and flour particles of high mold content when heavily laden with such matters and jarred by passing trolleys, trucks, etc., outside. Several clean waste barrels were about. Mixing and raising tubs were of wood and old, and the ovens were old coal ovens with the fire in one corner of the hearth, fed from a coal shed which opened into the shop. The entire shop was dusty and in need of mechanical ventilation.

The personnel of the rear shop (the front shop or sales room being separate and perfectly satisfactory, therefore not in need of description) was acceptably clean, neat and uniformed and consisted

of four men. Their uniforms on the day of inspection were somewhat soiled.

In the basement were several undesirable conditions. Fruit flies were profuse and obviously breeding rapidly in and about stored and opened tubs of commercial pie filling. Poison fly-paper was exposed. A wooden sink for dish washing, in one corner beneath the cellar stairs, was littered and dirty. A few cobwebs were in evidence, though not excessive for a basement. Two toilets were in this basement, protected by double partition and double doors, whose action, however, was not automatic. The toilets, though dingy and slightly dirty, did not constitute a nuisance, but lack of lavatory facilities was a bad feature.

The rear part of the basement was equipped as an ice cream plant with an excellent, well drained, concrete floor; entire basement well screened and with fair daylight and adequate artificial lighting. Flour stored here is dry and well kept. The rear of the shop opens onto a large court-yard which, observed from the proprietor's delivery platform, was clean, although some miscellaneous rubbish barrels of neighborhood shops and stores were present. These, however, did not constitute a sanitary nuisance.

(5) A "system" bakery on a very busy down town street. Above ground, fairly well lighted, and with good artificial ventilation. Excellently screened from flies. Floor and ceiling clean and satisfactory, but walls corrugated and covered with dust and flour particles. No water closet nuisance and plumbing satisfactory, and a basin for general washing purposes at rear of shop.

Employees satisfactory, but not quite immaculate in uniform. Personnel consisted of three bakers, three girl clerks, one messenger.

Utensils, mixers, dough troughs, racks, etc., scrupulously clean; raw materials well protected; rear door, though screened, often left open—draft, however, precludes flies.

Basement clean and dry and used for storage, also used for doughnut mixing. Pastry ingredients stored here and flies present, though not numerous, on jam, etc.

On the whole, a very acceptable bakery and it is to be supposed from the system of management, whereby each shop in the system is managed by a woman (and these managers meet often), that competition between managers serves to maintain standards.

(6) A large industrial plant. Local representative of a large baking concern. Perfect in every detail.

(7) Another large plant, though on somewhat smaller scale than No. 6. The only criticism is on their shipping department. The shipping room opens into the wrapping room and air currents enter from loading platform outside. This feature becomes more objectionable by virtue of use of horse and wagon delivery instead of trucks, making the loading shed objectionable from sanitary standpoint.

(8) A small city store bakery. Located on a main street but rather on the outskirts of the business center. The establishment consists of store and shop. Both above ground and fairly well lighted, but open windows on street level permitted the entrance of dust through ineffective screens.

Ventilation is accomplished by windows and fairly well carried out. There was evidence of flies and cockroaches. Walls and ceilings were whitewashed, but showed accumulation of dust, while the floor was untidy and of an absorptive material.

The employees were of average appear-

ance and the equipment was half modern and half old-fashioned.

The cellar where flour is stored was damp, but quite clean; while such other materials as lard were kept in uncovered receptacles.

The handling of materials in the process of manufacture was not particularly hygienic. The mixing was done by hand in wooden side-wall troughs.

The final product was placed on sale in the store, exposed to dust and flies and not wrapped.

(9) An inferior French city bakery. This shop is located in the heart of the business district. The establishment itself consists of two rooms, store and shop.

The ceilings are covered with sheet tin and the walls plastered. Both are painted white but not overly clean. The floors are wooden and as a rule fairly clean.

Ventilation is by means of a fan in the ceiling which opens on a court. Lighting is by electricity, there being no windows in the shop proper.

Mixing is done by machines, but all other processes are by hand. Proofing is carried out in open wooden trays. The bread is baked in ovens without steam, for fifteen minutes at 425° F.

Yeast and flour are stored in the cellar which is very dirty and has a foul odor.

Toilet is over the shop and connects by means of stairway.

The employees, four in number, are not overzealous in their personal care, all wear caps and work in shirts.

Bread is cooled in wooden barrels with no precautions taken to prevent contamination from the air which is very dusty.

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Your paper is splendid. It should be beneficial to the bakers if they will digest the contents as they should.

A. N. PHILLIPS,

Central Ohio Supply Co., Columbus, Ohio.



# Pitiless Publicity on Coast

*Dr. L. M. Powers, Health Officer of Los Angeles, Gives Out Names of Unsanitary Bakers*

ONCE again the strong hand of the Government enters to steady the baking industry and honor those who have with the best foresight worked for its highest ideals.

It is out in Sunny Los Angeles where this latest move for cleaner bakeries takes definite form. Dr. L. M. Powers, health officer, has been for a long time hinting to bakeries that were not clean that cleanliness paid.

He wanted to see the city serviced by bakeries into which the women of the city could always be invited. So he scored bakeries A, B, and C as to class.

Those scored C had screens that had broken down, floors littered with dust and grime, walls that knew no washing down, and pan rooms that had never known such care, for instance, as the care of Mrs. Jacob Quint of Savannah. This beautiful woman had given her life to bakery care in all the spirit of devotion that made her home life beautiful and wholesome. Her motto had been for years never to send out a loaf of bread from Quint's bakery that she would not be glad to serve on her own table.

Her pan room, as the most difficult corner of her bakery, had become her pride and her joy and when visitors came through it there was no corner that had to be hidden away.

Los Angeles bakers had many hints that it would be well to do as near as a mere man can what Mrs. Quint had done so well in Savannah. Now comes the second chapter of the story. On the day this magazine is scheduled to come from the printer's presses the public press of Los Angeles will be given the names of all

bakers of that city. And behind the name of every baker with an uninviting, unsanitary bakery will be the letter "C" in large capitals.

The baker's trade will thus be notified that he had been too interested in making his loaf and not enough in satisfying the reasonable expectations of his customers that it will be a clean loaf, baked by healthy workmen in sanitary surroundings.

With the unpleasant notoriety of the "C" bakers will come some very pleasant notice to the "A" bakers and a sense of partial satisfaction to the "B" bakers.

We know now that walls of bakeries which accumulate dust also accumulate many "rope" bacteria that lie there awaiting a chance to grow and make bread unsalable. We know they lurk there, too, to ruin bakers and that the Father of the Modern Science of Sanitation made it a rule to wash down his laboratory walls as religiously as he washed his laboratory floor.

Before that he spread brewers' yeast on slices of bread and covered them with glass plates; when molds grew he thought it was the brewers' yeast that was growing. He did not know how the air and the dust of the air is full of microscopic organisms awaiting a bit of sugar, a bit of moisture, and a warm temperature to grow and propagate at a furious rate. When he discovered that he was growing "wild yeasts" or bacteria and molds on his bread slices, he discovered the thing that has given us the key to all modern hospital practice, camp sanitation practice—and Health Department rules for the government of the modern bakery.

It paid the brewers—first of the modern sanitarians—to keep clean walls, for molds and bacteria that caused “ropy beer” settled on the wort bags from the dust of the air, and made viscous, sour, and unsalable beer.

It is a strange fact of life that when a child is bitten by a mad dog they rush it at once to a “Pasteur Institute”. And the famous Pasteur to whose work these Institutes bear a fruitful testimony, was a chemist whose life work was done amid yeasts. It was he who discovered the role of yeast in bread. The victory he scored over Liebig, his great opponent who did not comprehend yeast, is exactly the victory that yeast-made bread scores to day over self-rising bread, made by a mechanical leavener, just as a tasteless, uninviting form of vinegar is made synthetically without the intermediary action of yeasts and bacteria.

And the victory Pasteur won for clean fermentation rooms, in which molds and bacteria cannot become loosed into dusty air, is exactly the victory that the clean hospital wins to-day over the unsanitary one, and the victory that Grade “A” bakeries will win in Los Angeles over Grade “C” bakeries.

There is something every community should take note of in this Los Angeles situation. What Dr. Powers is doing there is only what Lucius P. Brown did in New York when he was supervisor of its Foods and Drugs department of the Board of Health. In Indiana the happiest bakers to-day number in their membership bakers who once fought bitterly against a Board of Health man who tried to make them “clean up.” Now they tender him banquets at times in honor of the great advance he made in SELLING VOLUME for their bread.

W F. Ireland, the live secretary of the Southern California Bakers Association,

did not fight the Health Officer in this case, as was once the custom. For to the Editor of this magazine he wrote of the ideals that all must serve who bake bread for the American people:

The time has arrived when monkeying with the public must cease, when lying and underhanding your competitor in the baking business must be banished from the plan of business development.

Let us shoot through our papers high principles for the industry. Let us demand of the Health Departments and of the legal authorities the action necessary to see that those who will not conduct their business in a manner to gain public confidence, are brought to understand that he who monkeys with the essentials of life, such as enter into human consumption, must consider this Industry too important for him to remain long therein by unprincipled, underhanded methods.

Whether bakers welcome or rebuff actions such as that of Los Angeles it is fairly certain, from the past record of their appearance, that every community in America is going to have its turn facing them. The prepared baker is the one who will win through when the test comes. Dr. Oscar Dowling in Louisiana is enforcing as the state’s chief health officer, just the kind of standards to which Los Angeles now rises, and goes on public record.

Dr. William C. Witte, of the U. S. Public Health Service, is ready at the offices of the American Bakers Association, 1135 Fullerton Avenue, Chicago, to give any inquiring baker advice and suggestions as to just how to make his bakery all that the highest standards of the U. S. Government suggest it should be. It is safe to say that any baker who squares his practice with the suggestions he can obtain by writing here will never have to fear a swooping down of local inspecting forces. Instead he can always meet them with a smile and tell them how welcome they are.



# Yeast Ferments and Our Tasks

*They Are Simple, but the Baker Who Knows Why He Helps  
Does Most to Make Them So*

WHEN the orange growers of California decided that making good will for orangemen and oranges was the work of one man, with the sale of the whole orange crop as his problem, and a tax on every orange as his working fund, 5,000 car loads a year was considered the "market saturation" point.

Orange growers actually advised chopping down groves in excess of the 5,000 limit.

But G. Harold Powell, when charged with the duty of making an orange market floated out on every passing breeze some little message of good will.

He developed an "oranged idea" in diet. He called in chemists who found out what it was about the orange that made it essential as a food. He advertised its vitamin richness to all the world.

And soon it was as easy to sell 28,000 car loads as it had been to sell 5,000 car loads. For one thing he never let an orange get into a box which, because it was green, undersized, or spoiled, would unsell the previously built-up good will.

Result? When some timid souls thought 28,000 car loads of oranges marked saturation point Powell called on his timid followers to plant 70,000 more acres of groves!

But how is it with bread? When bakers should be seeking most energetically to find the common grounds on which to get together, too many are seeing only the points on which they can fall out and split asunder their organization. They do not wait for a residue of irreconcilable things to appear before they start to fill the horizon with the words of war.

And yet the bakers have a message that can do for bread all that G. Harold Powell has done for oranges. If every baker preached it from the house tops it would win converts to bread as now baked among many who have turned away.

It was Harvey W. Wiley who, when he wanted to talk about other foods, started off his book with the title. "Not By Bread Alone."

Now it turns out that the difference between bread and macaroni, practically all of which is to be credited to the yeast content, is a difference of a most vital nature. Yeast actually acts upon the flour in a way to build up its nutritive value.

Its contribution is so great that self-rising flours should be scorned as synthetic orange juice is now scorned by all informed students of nutrition. They know it is not capable of doing the work of the real orange juice in human body building.

Yet how is the message of yeast-made bread going to get across? By lantern slides, by lectures, by magazine articles, by newspaper articles, by cooperation with the government officials charged with studying nutrition.

The new knowledge of yeast and its important role in bread making has only very recently been reduced to printed words. Our grandfathers thought that fermentation was a process of decay and break-down of tissue.

Now they know it is due to the operation of tiny creatures, so powerful in their will to grow that they could sustain a railroad train and locomotive above a yeast-and-flour tank having a surface of only 120 square inches.

"Practically all the difficulties experienced by bakers are traceable to fermentation" writes W. J. Mycue in the *Western Baker*, published at San Francisco. "Fermentation is the one great factor the baker has to deal with in bread making, for the color, flavor, texture, grain, volume, general appearance and keeping quality of the finished loaf depend on fermentation, regardless of any special ingredients that may be added."

And good will towards the whole baking industry will follow the education of the general public to the importance of this same fermentation in making them a food which has no equals and few rivals, with a flavor that is the only food flavor of which mankind has never tired.

Every baker knows enough by now to control his fermentation room's temperature by a thermometer, and to watch the process with the utmost care.

But when will the tide of support flow into the National association headquarters that means this same baker sees the need of convincing the housewife and home maker—in a National way—that the baker is doing for her in his dough room, something from which she cannot afford to turn aside?

A total of 3,000,000,000 pounds of home-baked bread per year in which self rising flour is used in the South alone, is a field for a conquest greater than Powell's orange conquistadores ever tackled.

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### *Bakers in New Zealand*

THE TRADE here in New Zealand has never realized the true value and dignity of its calling, and we hope that the day has now dawned when not only the bakers themselves but the Dominion as a whole, will realize that baking is the most important industry in our midst.

Needless to say the questions at issue

in America affect us also here in New Zealand. At the present time we are experiencing considerable difficulty relative to Bread Weight Legislation. We are seeking and hoping to secure in the near future an amendment which will be somewhat similar to the law in force in some of the American states. From the various bakers' magazines that have come to hand I have read a good deal of considerable interest relative to Public Health Regulations. This is particularly so as regards the return of stales. Here in New Zealand the return of stales from the private customer is prohibited by law. Of recent years due to the cost of delivery a very large amount of bread has been distributed through the medium of grocers. There was nothing to prevent the return of stales due to the fact that the bread was practically placed on consignment for sale or return. As a result of continued agitation we have at last secured a definite promise from the Deputy Director-General of Health, that the necessary amending legislation will be introduced to prohibit this undesirable condition of affairs.

The matter that is of most importance to the Dominion is flour and its production. The government, as a result of pressure brought to bear through our various conferences, has done something in the way of research work but much more requires to be done. Legislation has prohibited the importation of outside wheat and this naturally militates against the production of a quality loaf such as the trade would desire to offer the public.

We are but small folk over here but I trust not without ideals, the attainment of which will be rendered more possible by being thus brought into contact with your Association.

—From a letter of J. Heaton Barker, Secretary, New Zealand Master Bakers & Pastrycooks' Association, Auckland, New Zealand.



# The Press, Baker, and Women

*How a Wild Crusade for Kitchen Baking in San Francisco Fell Quite Flat Because of Women's Intelligence*

WHEN are the editors of modern newspapers going to wake up to the fact that the modern woman no more cares to bend her back over the kitchen bread pan than the modern editor cares to have his opinions reach the public through hand-set type fonts?

In Detroit newspapers made a great ado about "home baking." They tried to shoo the women of Detroit back to their kitchens by offering big prizes for the "best loaf of home-made bread." They shooed and shooed and shook and shooed, and the sale of bakers' bread went on just the same.

In Scranton, Penn., one newspaper flew into furious batches of hysterical type,—and bakers found the newspapers had lost their cunning with the women.

Why?

Let Mrs. John S. Sloan, president of the Congress of Women's Clubs of Western Pennsylvania, give the answer. She gave it as a modern woman at the Pennsylvania State Convention of bakers at Bedford Springs, Pa., June 6th. When she was introduced by President L. J. Schumaker as "the first woman ever to appear at a bakers' convention in Pennsylvania," this intelligent lady replied:

"THIS IS AN AGE OF SPECIALIZATION AND WE BELIEVE IN LETTING SPECIALISTS BAKE OUR BREAD. WE BELIEVE IN COOPERATING WITH THEM, making sure that our expectations of clean, sanitary bread are realized, and then welcoming them as useful members of society."

## *An Age of Specialization*

There is one editor in America more read than all the others put together. He

knew so well how to write of the commonplace events in the lives of "just folks" that besides the Hearst newspapers with their millions of readers, his words are now printed in his column, "TO-DAY" in newspapers in almost every American city.

This unusual editor, Arthur Brisbane, replied to a letter from Baking Technology, giving him facts about modern baking conditions that "anything that tends to rescue woman from drudgery is important."

He knows better than to start "crusades" for home baking, when he knows that these crusades rank with crusades for learning the use of fencing foils in an age of Lewisite gas, aeroplanes, Springfield rifles and T. N. T.

Yet other editors have tried to while away dull summer "news" periods" with such foolish campaigns. One such editor on the Pacific coast wrote glowingly of meetings of the Housewives' League in which 250 women were represented as being present. All were said to be in favor of home baking and to have voted to have their secretary call up all the women in Alameda County towns and ask them to return to kitchen-baked bread.

## *Women Misrepresented*

The situation was interesting. How could these women be so different from the women of the Women's Clubs of Chicago who knew and publicly admitted that their own leisure—the leisure on which women's clubs have been built—is foundationed on bakers' bread?

Inquiry was made in Oakland, and this was the answer that came from J. P. Rettenmayer of the Remar Company.

"In reference to the publicity given to the alleged demands that all Pacific coast women return to home baking will state that it is largely a matter of the newspapers. The Housewives League was reported to be extremely active at various times, but an investigation disclosed that when the newspapers reported 250 present at a meeting at which bread was discussed there were as a matter of fact, only about 25 present and these never mentioned bread at all.

"The Vigilant Committee of the City and County Civic Federation of Women's Clubs which embraces practically all the women's organizations including the Housewives' League, made an investigation of the Employment Agency situation.

"The women present at one meeting I attended, including the women of the Housewives' League, were intelligent and fair in their attitude and statements.

"The papers, even those rated as conservative, reported the meeting in a reckless manner. I took occasion to write to the Managing Editor of one of the leading dailies, complaining about the inaccuracy of their reports and calling their attention to the fact that such conduct was unfair to the individuals whose names were used.

### *The Press Assailed, Too*

"I made a suggestion to the Chairman of the conference that the press be excluded at a subsequent meeting and a statement written out giving the news of what took place. I was informed, however, that this was contrary to the policy of the Vigilant Committee. But I think that this policy was adopted without consideration of the way the newspapers scandalize activities of various public bodies instead of giving the news of their activities.

"It is possible that through the combined efforts of certain organizations the

newspapers will be induced to inform rather than excite their readers regarding the activities of certain organized groups."

There you have a situation to which the wisest men of Journalism are giving much thought. They, too, are finding they have a good name to retrieve that has been foolishly thrown away. Perhaps a study of many of their bread crusades will show the wisest leaders of Journalism where they have thrown it, in goodly part. For all the press noise on the Pacific Coast no baker was appreciably injured in his volume of sales, and you'd never have guessed it until you looked behind the newspaper files.

### *As Said In Passing*

I congratulate you upon the very high character, both of contents and make-up of this splendid paper.

No baker who expects to even keep abreast of baking conditions can afford to be without this splendid paper, and it promises to add much of value to the development of higher standards among the bakers.

ELMER C. CLINE, Indianapolis, Ind.

There is a lot of useful information to both the baker and the man of science who is trying to help the baker.

R. HARCOURT

Ontario Agricultural College, Guelph, Canada.

I have found Baking Technology very interesting and I feel that it is not too technical for the baker. The idea of the clip sheet is a very good one and will surely bring results if the recipients of the paper will do their part. Let the good work go on.

C. H. BRIGGS,

Howard Wheat & Flour Testing Laboratory.

Minneapolis, Minn.



# What Clean Hands Can Mean

*They do Most in Bakeries, if Soiled, to Contaminate Bread*

By DR. WILLIAM C. WITTE

*Passed Assistant Surgeon U. S. Public Health Service, Assigned at the Request of the American Bakers Association to Survey the Baking Industry.*

IT CAN be said, without fear of contradiction, that the products of bakeries are eaten by every individual in the United States. These products are eaten without further cooking. They must therefore be free from any contamination which would be harmful to human life. They must be prepared, handled and delivered under the most rigid of sanitary requirements, and must be received by the consumer in a clean and wholesome condition. This necessitates the persons engaged in bakery production exercising absolute cleanliness of shop and person. Each bakery worker must be clean. Cleanliness may be defined as freedom from dirt.

The dirt which we are interested in when discussing protection of the Public Health is that dirt which is dangerous to human life and which, when taken into our bodies (usually through our mouths), causes sickness and sometimes death. This dirt is found in all discharges of the body, spittle, droplets of moisture expelled during sneezing, coughing, and loud talking (nose and throat spray), urine and feces (bowel discharge). We might more definitely define this dirt by calling it germs, which, as you know, are the seeds of disease.

The source of disease in humans is usually from other humans, although certain diseases are contracted from lower animals. Diseases are spread usually in one of three ways, namely, direct (person to person by actual contact); indirect (person to person by means of mechanical carriers such as fingers, flies, water, milk,

dust, etc.), and by intermediary hosts (person to host to person), an example being the role of the mosquito in malaria, where the parasites of malaria must undergo certain changes in the mosquito before they are infective to another person.

The fingers of individuals act as mechanical transmitters of these germs from the discharges of one to the mouths of the other. How? The hands of an individual come in contact with nose and throat spray when one passes his hand across his mouth, when the hand is used to cover the nose and mouth during sneezing or coughing. The fine droplets of moisture contain germs which collect on the hands and are conveyed to animate and inanimate objects which the hands come in contact with.

Each individual harbors germs in his nose and throat; some of these germs are undoubtedly harmless, but others are harmful and dangerous to human life. Certain persons known as "Disease Carriers" may harbor germs of pneumonia, diphtheria, influenza and other respiratory diseases in their nose and throat and not show symptoms of the disease. It is obvious that these persons expelling droplets of moisture bearing the germ of these diseases onto their hands might be a source of danger, especially so when they are handling food stuffs, which are to be eaten without further cooking.

There are certain other diseases, the transmission of which can be directly attributed to the contact of fingers with body discharges and being carried by

these fingers to food which is eaten uncooked. The commonest and best example of this type of disease is typhoid fever. It is a well-known fact that persons who have typhoid fever harbor germs of the disease in their bowels and kidneys and those who have had the disease might harbor these germs for considerable period subsequent to convalescence and may even become disease carriers and harbor the germs for years after recovery. These germs are contained in the bowel and kidney discharges of these persons and fingers soiled by these discharges are the mechanical conveyors of typhoid fever.

Several epidemics of this disease have been directly traced to the fingers of typhoid carriers.

The public is thoroughly aware of the danger of contracting disease through its food supply. It is therefore imperative that every baker realize the essentials necessary to the proper protection of his products.

It is essential that only healthy workers with clean personal habits be employed in the preparation and handling of bakery goods. This includes all workers from the foreman to the delivery wagon driver.

### *A Vancouverian View*

IT IS possible that I may "butt in" to your dear Chicago long enough to meet you at the exhibit in September. Looking at your work from our view point up here in Canada I should say you are to be congratulated on the wonderful things that you have accomplished.

I am sorry we in Canada are not able to carry on an association such as you have. We have, however, noted the speed and dispatch with which you bought your splendid new home and plunged into educational and research work for the

benefit of both those inside and outside of your association.

While the dues may appear high at first sight, only a parasite would remain outside of your Association, because of the good he must receive indirectly at least from its efforts. We feel that every baker in the United States should belong because after all it is their association and if this amount is too high, money will soon accumulate and the directors will quickly reduce the fees. You have much to take up in connection with the tariff, legislation, and express rates, as well as creating a National good-will in America towards bread and its bakers.

—From a letter of W. C. Shelly, Shelly Bros., Limited, Vancouver, Canada.

### *They are Gone*

WITH less than 1,000 assured readers where to fulfill its function it must have over 10,000 readers, Baking Technology was launched in January.

The vision of the need for a National headquarters to work for the weal of the baking industry had not yet been seen by multitudes of bakers. They felt no call to listen to a common voice, dealing with data assembled at a common headquarters for the good of all. Their shop, or their city or their state marked the margin of their vision.

Over 3,000 copies of the first two numbers of this magazine remained unsold.

Now they are gone. And the day when new subscribers may obtain complete files has passed.

We are pleased to announce that the publication total rose from 5,000 to 6,000 for the last number and that we will never feel happy or confident until it passes the 10,000 mark, and drives home to every baker every month every issue that in any way affects his welfare or the good name of his industry.



## How to Control Insect Pests

As Told by ROYAL N. CHAPMAN, of the University of Minnesota

INSECTS INFESTING STORED FOOD PRODUCTS. By Royal N. Chapman, Division of Entomology and Economic Zoology. University of Minnesota, Agricultural Experiment Station. Bulletin 198. December, 1921.

**T**HE AIM of this useful bulletin "is to make it possible for any one who is troubled with insects in stored food products to determine for himself what insects are causing the trouble, where they came from, and what to do to get rid of them."

The various insect problems of seedsmen, grain dealers, millers, grocers, bakers and other manufacturers and handlers of food products are discussed separately in the first part of the bulletin. Sections are devoted to the identification, and classification of the various insect pests, and the last three chapters treat of the general methods of heat, fumigation and protective storage for combating them.

This publication will be of considerable interest to the baker. Professor Chapman states that the common insects that may cause trouble in bakeries are:

Miscellaneous Insects:

- Cockroaches
- Ants
- Lepismids

Beetles:

- Confused flour beetles (very common)
- Saw-toothed beetles (common)
- Cadellies (rather common)
- Meal worms (*Tenebrio*) (not rare)
- Drug store beetles
- Broad-horned beetles

Moths:

- Mediterranean flour moths (common)
- Meal snout moths (rather common)
- Indian meal moths (rather common)
- Angoumois grain moths

According to the author, "Insects may injure the business of a baker in two

ways: (1) the flour and other raw products may be destroyed, and (2) the reputation of the bakery may suffer because customers find insects in some of the products or see them in the sales rooms. In either of these cases the baker feels a financial loss as well as a loss of time and effort in trying to get rid of the pests.

"Fortunately, the destruction of large amounts of flour or their damage beyond the possibility of use is not very common. However, many such cases are known. For example, in the summer of 1918 a car lot of rye flour was found by the writer to be damaged to such an extent that the baker had to dispose of it for stock feed; and several lots of from 200 to 600 pounds of wheat flour were found in such condition that they were almost total losses. In addition to the actual losses in all these cases was the necessity for the careful sifting of all flour stored in the same room.

"In many cases the loss of the reputation of the bakery is undoubtedly more serious than the loss from flour which has actually been destroyed. This fact was especially emphasized during the war when bakers were having unusual difficulty with the materials that they had to use and when many people were patronizing bakeries to an unusual extent. Many complaints were made by patrons who either had found insects in bread or had seen them in the sales room. On the other hand, many bakers who realized the seriousness of their trouble appealed for help in an attempt to avoid the possibility of such complaints.

"When a patron finds an insect in the bread he is eating or has seen an insect in the show case when he was about to make

a purchase, no explanation will be accepted and no argument will convince him that there are not insects in all the goods from that bakery. The public is rather suspicious of the places where its food comes from and does not care for apologies with regard to them. There can be no doubt that unfair statements are made on the basis of a single insect found in bread, but the only way to satisfy the public is not to let any insects get into the bakery. An instance of this came to light when a complaint was made that four insects had been found in one loaf of bread and a slice of bread was shown as evidence, but when the bakery was carefully inspected there was no evidence that insects had ever been present in great numbers. It was very evident that the occurrence of these insects in the bread was more or less an accident, but it was a most unfortunate accident because this customer said that he would never trade there again and he also took the trouble to tell his friends about the case.

"The usual and the easiest way for insects to get into a bakery is for them to be brought in with the flour. Old flour is desirable for baking purposes and the older it is the more opportunity the insects have had to reproduce in it. If the aging of such flour takes place in the store room the insects may spread to all parts of the bakery.

"When exchanged sacks are refilled without cleaning, insects which may be in the sacks have every opportunity to go on reproducing. If sacks from an infested bakery are sent to a clean bakery, the insects will be introduced unless the flour is carefully inspected and rejected. Used sacks should never be refilled without being thoroughly cleaned and heated, as will be described later. Flour should never be put in the storeroom until it has been inspected and found to be free from insects.

"Insects will usually thrive wherever there is sufficient warmth, moisture and food. The insects with which the baker is concerned develop very slowly at temperatures as low as 55° F., while between this and about 90 degrees the development is rapid, especially at the higher temperatures. Most insects die in a few hours in a temperature of 120° F., and few can endure a temperature of 140 degrees for even a very short time. Thus most of the insects with which we are concerned develop most rapidly, other things being favorable, at a temperature of about 80° F., while a temperature either too high or too low is unfavorable for them.

"Moisture affects insects in much the same way as temperature does. A medium amount of moisture favors the most rapid growth and development, while either more or less is unfavorable for the insects. Unfortunately, the usual moisture content for ordinary flours and meals is very favorable for the rapid growth of insect pests. When the moisture content is unusually high the insects are usually affected more by the molds which appear in the flour than by the moisture itself. When it is very low the material may become too hard for the insects to use as food or they may dry up.

"Any of the flours and meals used in a bakery are satisfactory food for insects. As the temperature and moisture conditions are usually favorable and as food is always present, a bakery is a good place for insects to grow and reproduce in. From four weeks to a year, depending on the species, are required for insects to pass through all stages from egg to adult, and if careful cleaning is done every day or two, the insects can not thrive. This does not mean that an accumulation of flour on the floor, which is less than four weeks old, will not contain insects. In warm weather eggs can hatch and good sized



larvae ('worms') can develop in a week or ten days; and a stock of flour which was infested with eggs at the mill may appear to be free from insects one day and be 'crawling' with young larvae a few days later.

"The most important thing for the baker is not to leave any flour in any place where it can accumulate and remain undisturbed. When even small amounts of flour are left on the floor, they may support enough insects to keep the whole bakery infested.

"Everything that comes into the bakery should be carefully inspected. Flour containing insects should not be allowed in the place even for the shortest time. Do not keep infested flour for a day or two before sending it back, for the insects may spread to other flour.

"Empty sacks should never be stored near the stock of flour. They should be kept in a place by themselves and looked over frequently to make sure that no insects are breeding in them. All sacks in which insects have been seen should be heated in the oven as soon as they have been emptied. Put them not more than three deep on boards and leave them in the oven for five minutes at a temperature of 350 to 450 degrees, F. Care must be taken not to let them scorch. The stock of flour should be stored on racks or supports high enough above the floor to make it possible to sweep under it. The store-room should be dry and cool. The entire establishment should be kept clean, all corners and cracks should be cleaned regularly. Barrels and boxes should never be left unmoved at the time of sweeping.

"All mixing and storage bins should be entirely emptied at least once a week and care should be taken to see that no flour remains in cracks and corners. The bins should not have cracks under them

or between them and the wall, for such places are ideal for insects to develop in.

"All proofing boxes that have cracks in them should be heated in the oven once a week. Any other utensils which may contain insects can be heated in the oven in the same way that sacks are heated.

"When cockroaches are present, commercial sodium fluoride should be sprinkled about the places where they run. This should be done throughout the whole establishment at the same time.

"Ants are difficult to deal with in a bakery.

"The only way to rid a place of ants is to locate the nest and kill the queen. The nest can usually be located by putting some granulated sugar out in a place which is frequented by the ants. Soon a long file of ants will begin carrying the sugar to the nest and they can be followed. When the nest has been located, carbon disulphide may be poured or squirted into it, and the opening securely closed. Carbon disulphide is very explosive and should never be used near a fire or light of any kind. Kerosene may be used, but it is less effective.

"If insects are already in the stock of flour and in the work rooms, all infested flour should be removed from the regular rooms at once and either fumigated or heated.

"It is seldom possible to fumigate the whole bakery, but it may be possible to heat it to a temperature of 120 degrees, F. or more for a few hours. When this is being done, all doors and windows must be tightly closed and boxes and barrels must not be left grouped in corners as they interfere with the circulation of the air. At least twenty-four hours are required for the center of a sack of flour to come to a temperature of 120 degrees, F. when the air surrounding it is at this temperature, therefore it is necessary to keep

the heat up for at least that time in order to kill the insects in the flour. The most favorable time for heating a bakery is in the summer when the outside temperature is high and when it can be begun on Saturday evening and continued over Sunday. Thermometers should be hung in various parts of the room to make sure that all reach a temperature of at least 120 degrees, F."

This bulletin may be obtained on application to the University of Minnesota Agricultural Experiment Station, University Farm, St. Paul.

C. B. M.

### *Abstracts of Technical Articles*

Selected from *Chemical Abstracts*, because of their special interest to members of the Baking Industry

#### **Nutrition and Growth on Diets Devoid of True**

**Fats.** J. C. Drummond and Katherine H. Coward. London. "Lancet" (1921) II, 698-700. Young rats grown from weaning to maturity on diets deprived as far as possible of neutral fats have shown normal development and behaviour. It would appear that neutral fats, from a purely physiol. standpoint, are dispensable constituents of a diet, provided a sufficiency of the vitamin frequently found in association with natural fats is contained in the other foodstuffs. The real value of fats as convenient sources of energy is obvious. E. B. Fink.

#### **The Dietetic Value of Sugar.** W. D. Horne.

"Sugar" 23, 603-4 (1921). A table of values for sugar and other food products gives the relative value of these commodities as foods. The consumption of sugar has risen in the U. S. from 49.95 lb. per capita in 1885 to 86.56 lb. per capita in 1920. C. H. Christman.

#### **New Knowledge on Ropy Bread and the Organisms Which Induce This Decomposition.**

C. Brahm. "Z. ges. Getreidew." 13, 105-13 (1921). B. carefully reviews the investigations of Lloyd and also the facts known about this disease of bread. The investigation started by B. led to the isolation of 5 organisms belonging to the mesentericus group, which caused this disease when introduced into bread. These organisms could be easily isolated from flour and meal and the outside

of loaves of bread which would indicate that they are always present in pastry products. They require an alk. reaction for development of "ropy." The cultural properties of the organisms, which differed in no way from the usual spore-forming organisms found in this defect of bread, were determined. The following method was proposed for showing the presence of significant spore-bearing bacteria in meal and flour. To 300 cc. of sterile water in a 500 cc. flask, add 100 g. of the meal and shake thoroughly. Then add 1 cc. of this meal emulsion to culture tubes of liquefied agar and heat in boiling water for 20 min. After this pour the contents of the tubes into sterile Petri dishes. After 24 hours incubation colonies of *B. mesentericus* will develop. Less than 12 colonies, indicate that the flour is of no significance in this connection. Between 12 and 50 colonies indicates potential danger and more than 50 colonies indicates that the flour is unfit for bakery purposes. Factors which influence the formation of ropy bread are said to be degree of infection of the flour, moisture, temperature, the reaction of the bread and the composition of the loaf.

#### **The Determination of Dough Strength.** Ig.

Stainfaler. "Z. Getreidew." 13, 98-105 (1921). Place 100 g. of dough on a glass ball (1 cc.) supported on a needle and time the interval until the ball protrudes through the dough. Tables and discussion showing effect of water in dough on time interval and relation to strength of dough are given. H. A. Lepper.

#### **Variation in Moisture Content of Flour During Storage.** R. S. Herman and Walter Hall.

"J. Am. Assoc. Cereal Chem." 6, No. 3, 10 (1921). Daily results are given for H<sub>2</sub>O on a sample of flour stored for 1 month, with observations of temperature and humidity at time of sampling. H. A. Lepper.

#### **A New Type of Laboratory Baking Oven for Standing on a Tripod.** A. Fornet. "Chem.

Ztg." 45, 1091-2 (1921). An incomplete description, with 2 cuts, of a small oven for making baking tests on breads. J. H. Moore.

#### **Treating Meal or Flour With Hydrogen Peroxide.** E. C. Sutherland. U. S. 1,380,334,

May 31. Meal or flour (or cereals, beans or tubers) is improved in color and baking qualities by treating it with about 0.7% of its weight of a 3% solution of H<sub>2</sub>O<sub>2</sub> and then exposing it in a thin layer, on a traveling belt conveyor to the action of actinic rays.



# Winning New Express Rates

*Special Committee of the American Bakers Association Receives Marked Concessions After Washington Hearings*

OF ALL the battles which the bakers of America have fought out through their newly born American Bakers Association, the fight for fairer express rates has been the most definitely contested. A first skirmish line of victory has now been set up and along it our forces are digging themselves in.

The express companies built up during the years when raises in rates could be made without being successfully questioned, an express rate that often amounted to 25 per cent of the value of the goods shipped. Sometimes it amounted to 100 per cent.

They found the "going so easy" in the matter of new rates that they recently proposed still another raise on cake shipments, and thereby hangs the tale of their undoing. They wanted to put cake-shipment rates up from 50 to 75 per cent.

If we had not fought back, the raise would have gone into effect. But the special express-rate committee of the American Association demanded a hearing and the result of it was this brief telegram from Ralph D. Ward, chairman of the special committee to this office on July 14:

"Suspension board of Interstate Commerce Commission has granted our petition suspending proposed cake rate increase for 120 days commencing tomorrow, pending further hearings. Thanks for help."

When you understand that the Suspension Board is a sub-committee of the Interstate Commerce Commission and that its decision usually binds the Commission as a whole you will understand the huge potential savings to the baking industry that are involved in this first-line victory.

With Eugene H. Hickok as attorney and Carl Corby and R. D. Ward as spokesmen for the baking industry, a case was made out for cake shippers which could not be undone. One of the features of it was that the express companies charged as if they both delivered and picked up cake whereas the bakers at the shipping end and the consignees at the receiving end almost always did their own delivering and receiving.

## *Bread Victory Also*

Besides stopping the new cake rates from going into effect, the American Association's committee has brought new light to Washington on the matter of rates on bread. It filed a petition on June 30, 1922, which many bakers considered one of the finest examples of successful co-operation within the industry for a purpose equally good for all.

The petition made many rate makers who had never before seen things as the bakers see them, to comprehend some new facts as to the bread shipping problem. The petition went before the commission's members, and the result was this telegram to the industry's headquarters, also from Chairman R. D. Ward of the express-rates committee:

"Interstate Commerce Commission has ordered upon its own motion full investigation of express rates on bread with a view to reducing them to the old basis. We were instrumental in accomplishing this order."

The petition that convinced the Interstate Commerce Commission it should look into bread shipping rates, showed that express rates had mounted 50 per cent during the period of rising war costs.

AT

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association.*

Vol. I CHICAGO, ILLINOIS, AUGUST 15th, 1922 No. 8

## Our Bakers at Chicago's Pier

NEVER in the history of the baking industry has there been anything like it.

The big bakers of America will be there, each anxious to study new machines, new methods, new conditions. They will have their day—Thursday of Exposition Week.

The small bakers, who are the big bakers of tomorrow, will be there, each anxious to study machines adapted to their shops and problems that confront them of every kind. They will have their day—Wednesday, and it was especially arranged so that the Wisconsin delegation could come down to join with the general throng after a

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meeting of their own in Milwaukee, on Tuesday.

The men who make the machinery bakers need to keep up-to-date will be there. They will run the "Big Show on the Big Pier" and will have their day—Tuesday—to tell us all about it.

The men who care for the scientific problems of bread baking will be there and they, too, will have their day. Or rather days for the American Institute

of Baking will run daily courses for them. Altogether it is a conclave, a council, a World's Fair, a convention series portending a new day for the baking industry. Who can afford to stay away?



# A. B. A. on Pier and at Home

*National Association Will Hold Three Days' Program With Short Courses For All at American Institute*

**F**OR the American Bakers Association the great September exposition and convention week offers the chance to exhibit to bakers the new Home of their Industry for the first time in working condition and hard at work.

## *A Busy Week*

The week for the American Bakers Association will be a busy one. Here are the headlines of its scheduled events:

### MONDAY, SEPTEMBER, 11:

- 9 A. M. Registration of bakers at American Bakers Association booth, Municipal Pier.
  - 10 A. M. Meeting of Board of Governors, American Bakers Association at the Institute.
  - 2 P. M. Meeting of Executive Committee, A. B. A.
- AT THE INSTITUTE—SCIENCE DAY.** Short courses in the Milling of Flour, Microscopy of Flour, Food Value of Bread, Sanitary Control of Bakeries, Enzymes in Bread Baking, Hydrogenization of Oils and Fats, and the Chemical Laboratory Problems of bakers.

### TUESDAY, SEPTEMBER 12:

- 9 A. M. At the Pier, Registration of A. B. A. members at the A. B. A. booth.
- 10 A. M. Meeting of Board of Governors, A. B. A.
- 2 P. M. Meeting of Trustees of the American Bakers Foundation at the Institute.

### SPECIAL SHORT COURSES AT INSTITUTE.

Ingredients Day, embracing short courses in Flour Ingredients, Shortenings, Milk and Milk Products, Eggs and Egg Products, Yeast, Malt Products, and Sugars. Authorities on each subject will lead symposium to be participated in by visiting bakers.

### WEDNESDAY, SEPTEMBER 13:

- 9 A. M. Registration of A. B. A. members.
- 10 A. M. Meeting of Board of Governors at American Institute.
- 6.30 P. M. Dinner conference of members of State and local association delegates, and secretaries and presidents of State and local association at Municipal Pier.

**AT THE INSTITUTE—FORMULAS AND PROCESSES DAY.** Short courses on white Bread,

Whole Wheat Bread, Rye Bread and Sweet Yeast doughs, Homogenization, High Speed Mixing, Straight Doughs and Sponge Doughs.

### THURSDAY, SEPTEMBER 14:

American Bakers Association Day, at Exposition.  
10.30 A. M. Short Addresses.

1. The American Bakers Association, President A. L. Taggart.
  2. The Millers Federation, A. P. Husband.
  3. The National Retailers Association, John Hartley.
  4. The Allied Council, B. B. Grennell.
  5. Bakery Equipment, George Dean.
  6. The Cracker Baking Industry, A. V. H. Mory.
- 11.30 A. M.  
Address, The Man Behind the Loaf, H. C. Spillman.  
Address, the Banker and the Baker, H. A. Wheeler.  
Address, Our Marshaling Industry, I. K. Russell, editor Baking Technology.
- 2 P. M. Meeting Board of Governors, A. B. A. at American Institute.

**AT THE INSTITUTE, SALES PROMOTION DAY.** Courses in Selling Bakers Products, Bake Shop Accounting, Advertising for Bakers, Organization in the Bake Shop.

### FRIDAY, SEPTEMBER 15:

American Institute of Baking Day at Exposition.  
10.30 A. M.

1. Address, Dr. Max Henius, greatest authority on fermentology in the United States, founder of the Wahl-Henius Institute of Fermentology, now the American Institute of Baking.
  2. Address, Food Standards, Dr. W. W. Skinner, Assistant chief U. S. Bureau of Chemistry.
- AT THE INSTITUTE, PUBLIC AND LEGAL RELATIONS DAY.** Short courses in Unfair Competition and How to Meet It, Weights and Measures, Bread Standards.

- 2 P. M. Meeting of Board of Governors, A. B. A.
- SATURDAY, SEPTEMBER 16:**  
10 A. M. Business Session, American Bakers Association.

## *Allied Trades*

The Allied tradesmen will be called together on Friday and again on Saturday by their "daddy," Gordon Smith of Alabama. A fine program of speeches has been arranged for both sessions.

# Wednesday, the Retailers' Day

*It Offers a Sparkling Variety of Speeches in Two Sessions at Municipal Pier*

**H**ARDLY any American baker has grown so big that he does not remember when he sold bread from a shop built for "come-on-foot" customers only. Bakers who retail their own bread are coming to the Exposition in force and they are going to have Wednesday as their day. On that day they will discuss all problems that beset the retailer especially.

Somebody started a foolish story that retail bakers better keep away from the Exposition for fear they would be charged registration fees and asked for contributions far beyond their purses.

Eugene Lipp, President of the Retail Bakers Association, investigated these rumors and nailed them in the following statement addressed to the retail bakers of the country:

"These few lines are written for the benefit of those bakers of the country who are hesitating to come to Chicago for the week of Sept. 11th, to see the greatest of all Expositions ever staged by any body of men in any industry, and to take part in the yearly meetings of the American Bakers Association and the Retail Bakers' Association of America.

"The Bakery Equipment Manufacturers' Association went into this enterprise to make it The Bakers Own World's Fair, and to make it such they have spared neither time, nor money, or energy.

**"No baker attending need fear that he is going to be asked to make any Special Contribution in any way, shape or manner to any organization.** This is a broad statement, but I know it to be a fact; as I also know it to be a fact that for that very fear many bakers are hesitating about coming. It would be a shame

should any such unwarranted idea interfere with the glorious success of this undertaking.

All are welcome to come and see the glories of united efforts and reap the beneficial lessons of the Exposition. Help us to make the Week of Sept. 11 to 16, 1922, at the Chicago Pier, one that can not be easily forgotten."

EUGENE LIPP,  
Pres. Nat. Retailers' Assn.

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## PROGRAM OF RETAILERS DAY.

Call to Order, Pres. Eugene Lipp, 10.30. A. M.

Words of Welcome, Pres. Eugene Lipp.

Response, Felix Notz, Chairman Exposition Committee.

"Machinery in the Bakery"—Mike Hoffman, President St. Louis Co-operative Association.

"A New Day for the Retail Baker", Dr. C. A. Prosser, Director Wm. Hood Dunwoody Inst.

"Mixes and Emulsions", L. M. Dawson, Baker, Editor of the "Cracker Baker".

Appointment of Committees. Announcements.

Wednesday, Sept. 13th, Afternoon at 4. Business Session.

Call to order. Address—President Eugene Lipp.

Report of Treasurer George Geissler.

Report of Secretaries.

"The Retail Associations Travelling School". John M. Hartley.

Reports of Committees.

Standing Committee on Education. C. J. Kremer, Chairman, C. J. Lewis, Machatchek, L. F. W. Meese, L. F. Day, J. M. Hartley.

Report on Model Bread Law, C. J. Kremer.

Auditing Committee, and Nominating Committee. Election of Officers.

Retailers Day on Wednesday will be followed by American Bakers Association Day on Thursday and American Institute Day on Friday.



# “Ain’t We Got Fun”

*Plans of Entertainment Committee for the Bakers World’s Fair  
Make It Possible to Assert “I’ll Say We Have.”*

**R**EMEMBER when you come to meet and greet your fellow bakers at the Bakers World’s Fair, that you don’t have to belong to any association, pay any registration fee at the Municipal pier, or go to any meetings you don’t want to.

But if you bring a mind keyed up to grasp new ideas you will find them everywhere, in the machinery exhibits that spell profits for your pocket book, and at the American Institute of Baking where short courses will be run all day every day on every bakery problem the baker has to face.

And then the fun. This is to be no dullards’ convening. Come prepared to laugh and be entertained. Here’s the map of the days by the glad events of each. It was prepared by J. I. Marshall, chairman of the Entertainment Committee.

In addition there will be special entertainments for visiting ladies, to show them all that is most beautiful and attractive in Chicago. At the American Institute of Baking, 1135 Fullerton Avenue, there will be Open House, with afternoon teas daily for visiting ladies:

## MONDAY EVENING, SEPTEMBER 11:

Orchestra,—a dandy and it will remain with us every evening.

Dancing for Everyone and His wife.

Cabaret Singers,—eight of them.

Vaudeville Show,—a five act show without a dull moment.

## TUESDAY EVENING, SEPTEMBER 12:

Orchestra, dancing, cabaret.

Bucking mule. You get paid if you stay on.

Cotillion with 16 features,—a get acquainted number starring our sixteen heaviest bakers in a ballet dance.

## WEDNESDAY EVENING, SEPTEMBER 13:

Orchestra, dancing, cabaret.

Six Educated Pigs and the man who trained them. These pigs are wise birds.

“The Days of ’49” with Calamity Jane’s Dance Hall and Denver Dan’s Gambling Joint, Roulette etc. If you insist on gambling we’ll furnish the money. It’ll be stage money from our \$2,000,000 fund. If anybody gets rough the “Sheriff” and his deputies will take him before “Old Jedge Lynch” whose court room will never be closed.

## THURSDAY EVENING, SEPTEMBER 14:

Orchestra, dancing cabaret.

Vaudeville Show, surprise features.

## FRIDAY EVENING, SEPTEMBER 15:

Orchestra, dancing, cabaret.

Splendid Vaudeville Show.

## Joy After Work

These pleasant bits of entertainment, be it remembered, are to utilize the play time that comes after work. The best way to enjoy them is to utilize the short courses at the American Institute, running continuously in the day time, and the machinery exhibits, as the preface of daylight’s hours.

## A Flour Slogan

“**MORE** Good Bread Flour per Acre” is a slogan for farmers of our wheat belt proposed by Prof. W. A. Ostrander, of Purdue University. He is urging the farmers not to plant wheat from which they would not like to buy the flour. More strength to the good professor’s elbow.

# Machinery You Will Want to See

*How to Find Exhibitors in Whose Products You May Have a Special Interest*

**M**ANUFACTURERS of bakers' machinery who make sound goods do not serve their profit accounts alone, any more than do makers of the De Laval separator for cream and Eli Whitney's Cotton Gin.

The people of Savannah point with great pride to the statue they erected to Whitney, and they tell with tones of respect how his invention rescued women from the slavery of the loom. Their delight in honoring him is shared by the whole nation of course.

And it is just so with the De Leval separator. A new Book of Milk praises

him so highly that words almost fail to do their duty of registering the honor dairy-men think is his due. Perhaps in this very exposition is the baking machinery man who will write his name on the Scroll of Fame as definitely as have others among America's greatest inventors.

No baker can afford to treat lightly the claims of a machinery man who goes to the trouble of coming to this great Exposition to set them forth. Therefore we gladly give space to the list of machinery exhibitors on the Municipal Pier and the booth numbers where they are to be found:

Name of Exhibitor	Address	Space on Pier
Advance Milling Co.....	Chicago, Ill.....	330
American Paper Container Co.....	Toledo, Ohio.....	333½
Allison, Daniel K.....	Milwaukee, Wis.....	157
American Bread Wrapper Co.....	Chicago, Ill.....	106-110
American Bakers Machinery Co.....	St. Louis, Mo.....	207-8-11-12
American Diamalt Co.....	Cincinnati, Ohio.....	231-32-35-36
American Oven & Machine Co.....	Chicago, Ill.....	279-83-87, 280-84-88
Atlas Truck Co.....	York, Pa.....	351-52
Allen & Co., J. W.....	Chicago, Ill.....	43-44
Bernhard Stern & Sons, Inc.....	Milwaukee, Wis.....	321
Bahnson Co. ....	Winston-Salem, N. C.....	5
Baker Sons & Perkins Co., Jos.....	White Plains, N. Y.....	128½ inclusive aisle Space to 152 inclusive 127½ inclusive aisle Space to 151 inclusive
Battle Creek Bread Wrap. Mach. Co...	Battle Creek, Mich.....	195-196
Bennett Oven Co.....	Battle Creek, Mich.....	203-204
Bear, E. A. Co.....	Chicago, Ill.....	83
Bear-Stewart Co.....	Chicago, Ill.....	162-166
Ballantine & Sons P.....	Newark, N. J.....	57
J. G. Cherry Co.....	Cedar Rapids, Iowa.....	300
Century Machine Co.....	Cincinnati, Ohio .....	35-36-39-40
Chapman-Smith Co.....	Chicago, Ill.....	215-216
Campbell System, The.....	Kansas City, Mo.....	370
Central Waxed Paper Co.....	Chicago, Ill.....	333
Champion Machine Co.....	Joliet, Ill.....	183-87-88
Colborne Mfg. Co.....	Chicago, Ill.....	7-8
Columbus Show Case Co.....	Columbus, Ohio.....	214
Commercial Truck Co.....	Philadelphia, Pa.....	339-340
Corn Products Refining Co.....	New York, N. Y.....	374
California Fruit Growers Exchange...	Los Angeles, Calif.....	253
Cass Co., D. W.....	Cleveland, Ohio.....	189
Doughnut Machine Corp.....	New York, N. Y.....	173
Dry Milk Co.....	New York, N. Y.....	170
Dutchess Tool Co.....	Beacon, N. Y.....	347
Day Co., J. H.....	Cincinnati, Ohio.....	103-4-7-8-11-12
Duhrkop Oven Co.....	New York, N. Y.....	161
Eagle Roller Mill Co.....	New Ulm, Minn.....	382
Electric Storage Battery Co.....	Philadelphia, Pa.....	10



Name of Exhibitor	Address	Space on Pier
Faulds Co. Inc., T. A.....	Boston, Mass. ....	177-181
Filler Machine Co. Inc., The.....	Philadelphia, Pa.....	185
Fleischmann Co. ....	Chicago, Ill.....	365-67-68 to 381-83-84 including aisle
Ford Co., The J. B.....	Wyandotte, Mich.....	198
Freymark Steam Generator Co.....	St. Louis, Mo.....	184
General Motors Truck Co.....	Pontiac, Mich.....	191-192
Greisser, Richard .....	Chicago, Ill.....	70
Gumpert & Co., S.....	Brooklyn, N. Y.....	37-41
Hemrsley Mfg. Co.....	New York, N. Y.....	298
Hayssen Mfg. Co.....	Sheboygan, Wis.....	73
Hirsch Bros. Co.....	Chicago, Ill.....	179-180
Hobart Mfg. Co.....	Troy, Ohio.....	84½-88
Hubbard Portable Oven Co.....	Chicago, Ill.....	27-28
Hilker & Bietsch.....	Chicago, Ill.....	354
International Co., The.....	Baltimore, Md.....	59-60
Jaburg Bros., Inc.....	New York, N. Y.....	49
Katzinger Co. Edw.....	Chicago, Ill.....	360-359-356½-355½
King Midas Milling Co. ½.....	Minneapolis, Minn.....	193
Kuttbauer, Edw. ½.....	Chicago, Ill.....	366
Kotten Machine Co.....	Jersey City, N. J.....	97
Ladd Co., Jno. W.....	Detroit, Mich.....	300
Lee Flour Mills Co., The H. D.....	Salina, Kans.....	53
Lewis Co., G. B.....	Watertown, Wis.....	361
Liberty Yeast Corp.....	Long Island City, N. Y.....	291-92-95-96
Long Co., The W. E.....	Chicago, Ill.....	257
Lowe Co., Inc., Joe.....	Brooklyn, N. Y.....	109
Lockwood Mfg. Co.....	Cincinnati, Ohio.....	165-169
P. M. Lattner Mfg. Co.....	Cedar, Rapids, Ia.....	5½
Malt Diastase Co.....	New York, N. Y.....	105
Middleby-Marshall Co. ....	Chicago, Ill.....	227-228
Maag Co., The August.....	Baltimore, Md.....	158
Mathews Co., Frederick C.....	Detroit, Mich.....	174½
McCormick Co. Inc., The.....	New York, N. Y.....	378
Menasha Printing & Carton Co.....	Menasha, Wis.....	77
Merrel-Soule Sales Corp.....	Syracuse, N. Y.....	337
Newark Paraffine & Parchment Co.....	New York, N. Y.....	194
National Bread Wrap. Mach. Co.....	Nashua, N. H.....	156-160
Ottens Mfg. Co. Henry H.....	Philadelphia, Pa.....	357
Pabst Corporation .....	Milwaukee, Wis.....	345
Peerless Wire Goods Co.....	Lafayette, Ind.....	31-32
Proctor & Gamble Dist. Co.....	Cincinnati, O.....	341
Peerless Bread Machine Co.....	Sidney, Ohio.....	91-92-95-96
Peterson Oven Co.....	New York, N. Y.....	45
Petri & Jones.....	Boston, Mass.....	263-264
Read Machinery Co. The.....	York, Pa.....	48-52-56, 47-51-55
Reciprocal Exchange .....	Kansas City, Mo.....	362
Red Star Yeast & Products Co.....	Milwaukee, Wis.....	199-200
Reo Motor Car Co. of Chicago.....	Chicago, Ill.....	327-328
Roberts Portable Oven Co.....	Chicago, Ill.....	84
Retail Bakers School.....	Chicago, Ill.....	55-56
Stein-Hall Co. ....	Chicago, Ill.....	267
H. L. Schroeder Co.....	Chicago, Ill.....	99-100
Schulze Advertising Service.....	Chicago, Ill.....	205
Siebel Institute of Technology.....	Chicago, Ill.....	281
Star & Crescent Milling Co.....	Chicago, Ill.....	70½
Ad. Seidel & Son.....	Chicago, Ill.....	71-72
Superior Oven Co.....	Chicago, Ill.....	259-260
Thomson Machine Co.....	Belleville, N. J.....	271-72-75-76
Tin Decorating Co. of Baltimore.....	Baltimore, Md.....	239-240
Triumph Mfg. Co.....	Cincinnati, O.....	19½-20½-23-24
Union Machine Co.....	Joliet, Ill.....	63-64-67-68
Union Steel Products Co.....	Albion, Mich.....	155 to 175 inclusive 164 to 176 inclusive
Walker Vehicle Co.....	Chicago, Ill.....	11-12
Washburn-Crosby Co.....	Minneapolis, Minn.....	258
Westinghouse Elec. Mfg. Co.....	E. Pittsburgh, Pa.....	69
White Co., The.....	Cleveland, Ohio.....	74
Worcester Salt Co.....	New York, N. Y.....	174
Ward Baking Co.....	White Plains, N. Y.....	119-20-23-24 and half of 127-128
Ward Motor Vehicle Co.....	Mt. Vernon, N. Y.....	15-16 & Half 19-20

# Courses in Our Baking School

*Next Regular Class Will Assemble on September 5, and Will Conclude  
Its Work December 22*

**D**O THE bakers of America feel that their industry needs no school when an urgent telegram such as this comes in as an incident of a day's work at the new home of the Baking industry:

"Send us a baking superintendent or a good practical baker at once. Cannot wait.—Moon Baking Company."

As the public parks are for all the people, each in his hour of need for a recreational let-down, so our School of Baking is for every baker, each in his hour of need.

All we lack is a group of alumni and a bigger group of students going through. Many bakers laughed at the idea of a School of Baking supported by the industry as a whole. They said they knew it all in their own shops and could train new men in the shop as they needed them. But the most enthusiastic student our School of Baking obtained for its pioneer class was a baker with eighteen years of experience as a shop owner.

Have you a student for our School of Baking? Do you want to come yourself?

If you are interested for either of these, or for any other reason, the following information should be of timely appeal to you:

## *Next Regular Course*

The next regular course will begin the 5th of September and its graduates will conclude their work on the 22d of December. This will be a four months' course and will include the following features:

### 1. The Commercial Manufacture of Bread.

Report for work in shop, 6:30 A. M.

Shop Superintendents' Class, 8:15 to 10:15.

Lunch, by arrangement with instructor.

Shop work completed, 3:30 P. M.

General Class, 3:30 to 4:30 P. M.

This unit comprises the study of the manipulative portion of the work and involves the familiarization on the part of the student with the following operations by actual manufacture of bread by both hand and machine in a shop fully equipped with regular commercial machinery, corresponding to a commercial wholesale 10,000 loaf shop.

- A. Storage and handling of flour, sugar, salt, yeast, milk products, malt products, etc.
- B. Blending, sifting and weighing flour.
- C. Tempering and weighing water.
- D. Preparing ingredients other than flour for mixing dough.
- E. Mixing sponge and straight doughs.
- F. Bench work in making bread, rolls, etc., by hand.
- G. Fermentation of sponge and straight doughs.
- H. Use of mechanical dough dividing machine.
- I. Use of mechanical dough rounding machine.
- K. Use of mechanical dough proofing machine.
- L. Use of mechanical dough moulding machine.
- M. Panning bread.
- N. Proofing bread in merry-go-round proofers.
- O. Proofing bread in steam chambers.
- P. "Peeling" (feeding) bread into ovens.
- Q. Baking bread in patent and in portable ovens, using coal, coke, wood, gas and electricity as fuel.
- R. Unloading ovens.
- S. Use of mechanical bread cooling machine.
- T. Cleaning and preparation of bread pans.
- U. Use of non-automatic bread sealing machine.
- V. Use of semi-automatic bread wrapping and sealing machine.
- W. Use of fully automatic bread wrapping and sealing machine.
- X. Packing and shipping bread.
- Y. Use of cake mixing machines.
- Z. Use of and care of temperature and humidity recording instruments.



- AA. Use and care of dough troughs.
- BB. Use of bread labels.
- CC. Firing ovens.
- DD. Experimentation with new processes such as homogenization, etc.

The class work in unit one consists of the study of the problems of the bakery superintendent, such as:

- A. Figuring in the bake shop.
- B. Calculation of dough formulas.
- C. Calculation of shop schedules.
- D. Preparation of special schedules to meet unusual conditions, such as shortages on delivery orders, etc.
- E. Detection, elimination and prevention of bread diseases, such as rope.
- F. Construction, use of, and care of bake shop machinery.
- G. Records in use in the shop.
- H. Proper and improper formulas for the various baked products.

### Unit 2. Experimental Baking.

Report for work, 8:00 A. M.

Class, 9:30 to 10:30.

Laboratory work completed, 3:30 P. M.

General class, 3:30 to 4:30.

Note: Students assigned to the experimental bakery have no time to go to lunch. They must bring their lunch and eat on the job.

This unit comprises the study of actual personal experience of the effect of variation of process and ingredients in bread doughs, and teaches methods of evaluating all ingredients. The work is done in a baking laboratory, where each student has individual equipment even to the extent of scales and ovens.

- A. The baking test. Preliminary runs for three days to familiarize the student with the equipment and method of testing.
- B. The study of the effect of baking bread from doughs of different stiffness.
- C. The study of the effect of baking bread from doughs fermented at different temperatures.
- D. The study of the effect of varying the time of fermentation on strong and also on weak flours.
- E. The study of the effect of varying the percentage of yeast in the dough.

- F. The study of the effect of varying the percentage of sugar in the dough.
- G. The study of the effect of using different kinds of sugar in the dough.
- H. The study of the effect of varying the percentage of salt in the dough.
- I. The study of the use of diastatic malt extract in bread doughs.
- K. The study of the use of sweet raw milk in bread dough.
- L. The study of the use of sweetened condensed milk in bread doughs.
- M. The study of the use of milk powder in bread dough.
- N. The study of the use of shortenings in bread doughs as to amount.
- O. The study of the use of shortenings in bread doughs as to kind.
- P. The study of the use of processed corn flour in bread doughs.
- Q. The study of the use of malt extract in connection with processed corn flour.
- R. The study of the use of dextrinized corn starch in bread doughs.
- S. The study of means of eliminating granulated sugar from bread dough.
- T. The study of the use of certain mineral salts in bread doughs.
- U. The study of the use of commercial yeast foods.
- V. The study of the saving of time or yeast when using commercial yeast foods.
- W. The study of sponge and straight doughs.
- X. The determination of proper formula and procedure of baking for a sample of unknown flour.
- Y. Class work each day during this unit when the work of the preceding day is discussed in detail, and the work for the next day outlined.

### Unit 3. Related Subjects.

This unit consists of lectures and exercises in the following subjects. A total of 81 hours is given to this work.

- A. Bake Shop Mathematics.
- B. Nutrition (the food value of bread).
- C. Weight Laws.
- D. Labor Problems.
- E. First aid to the injured.
- F. Sanitary laws.
- G. Trade ethics.
- H. Business laws.
- I. Bake shop mechanics.

- K. Personal hygiene.
- L. Standards for materials.
- M. Sales problems.
- N. Factory sanitation.
- O. Unfair competition.
- P. Trade associations.
- Q. Bake shop accounting.
- R. Bakers' machinery.
- S. Care of employes.
- T. Application of science to baking.
- U. Social relations of the baker.
- V. Medical supervision for the baking industry.

#### Unit 4. The Chemistry of Bread.

Baking Chemistry Class, 8:30—9:30 A. M.  
 Baking Materials Class, 9:40—10:40 A. M.  
 Laboratory Conference, 10:50—11:50 A. M.  
 Lunch, 12:00—1:00 P. M.  
 Laboratory exercises, 1:00—3:20 P. M.  
 General Class, 3:30—4:30.

This unit comprises the study of the chemistry of bread and of the manufacture, properties and methods of testing bread ingredients.

The class in baking chemistry studies:

- A. Elementary chemical definitions.
- B. Chemical Equations.
- C. Properties of and application to baking of carbon, hydrogen, oxygen, nitrogen, sulphur, sodium, potassium, calcium, phosphorous, chlorine, bromine, and their compounds.
- D. Study of acids, alkalies, and salts.
- E. Elementary organic chemistry as far as it is applied to baking.
- F. Chemical mathematics as far as it is applied to baking.
- G. The chemistry of fermentation.
- H. The chemistry of bread diseases.

The class in baking materials studies:

- A. The manufacture, properties, and methods of testing of flour, sugars, salt, yeast, milk products, malt products, baking powders, yeast foods, starch products, water, etc.
- B. The microscopy of moulds, yeasts, and bacteria.
- C. Laboratory work consisting in application of the testing methods taken up in the class work.

During the course each student participates personally in the manufacture of approximately 30,000 pounds of bread,

visits under the supervision of the instructor many commercial bakeries, and comes in contact with visitors of prominence, who are asked to discuss problems of the hour before our classes.

No student is given a certificate until he has taken charge of our school bakery and produced a day's run of baked products in a satisfactory manner.

The equipment of the School of Baking consists of a fully equipped mechanical bakery of about 10,000 loaves capacity, an experimental bakery with six commercial electrically heated ovens, a chemical laboratory capable of accommodating twenty-four students at one time, a room specially equipped for microscopical work, two class rooms, club room for the men, and the usual offices, library and sanitary facilities.

Any one who is of mature age, who is interested in and, if possible, can show some proficiency in the baking trade, is eligible for entrance in the regular baker's course. Applicants for admission to the courses in cereal chemistry and technology and in the research department should send a full statement of their education and experience, upon which their application will then be considered.

### *A Word That Helps*

TO THOSE who have committed themselves to the tasks of the baking industry as focused in the industry's National home, nothing is so heartening as knowledge that they are backed up at home.

"Having in mind the old slogan 'come early and avoid the rush' we hand you herewith our check for dues," writes F. Bode, secretary of the Royal Baking Co., of Salt Lake City, "and at the same time we wish to assure you that the efforts you are putting forth to build up the baking industry are appreciated here."



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entry in the post-office at Chicago, Illinois, as second-class matter,  
applied for under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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AUGUST 15, 1922

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### *As a Senator Sees It*

**L**AW makers who attempt to build a tariff that does not count in the food consumers of America try to do what many others have attempted to their own destruction. Every baker knows that the people are as sensitive to bread prices as to any other element of their daily lives. All that the industry can ask is that it be allowed to press forward sufficiently over "into the black" of the ledger to seek out new improvements, find new ways, and improve bread quality.

Within the common elements of life are all necessary equipment to terribly punish the baking industry if it ever lets costs to consumers run away from costs of doing business. The "shoe string baker" with his dish pan, yeast cake and kitchen stove as a total equipment is always ready to spring into

being when there is the least opportunity. If industry slacks and father loses his work, mother turns to kitchen baking to help out. If prices pass very definite boundaries the bakers receive the punishment of a refusal to buy.

This is especially so in the matter of cakes, where expensive products always mean few or no sales. What then have the people of America and the bakers of America to say in common about plans to vastly increase cake costs by tariff schedules on nearly all essential ingredients?

Fortunately we have no need to formulate our case ourselves. U. S. Senator Atlee Pomerene of Ohio has put our case into words for us, and for all food consumers:

"I am obliged to you for your information about the effect of the proposed tariff schedules on baked goods," he writes to Dr. H. E. Barnard, "but I have serious doubts as to whether the senate can be prevailed upon to change these duties on nuts, sugars, etc. THE CONSUMER SEEMS TO BE WHOLLY LOST SIGHT OF IN THIS PENDING TARIFF LEGISLATION. The more thoroughly it is understood throughout the country the more this legislation will be condemned."

Could any appraisal of a piece of National legislation be more sweeping in its condemnation?

## *The Test*

**H**OW many bakers will be at the conventions on the Municipal Pier, Chicago, next month?

A huge convention, well filled with live men who have live views to offer on our National problems, will spell growth and will repay all the pioneer work of this past year, however much the pioneers may be "razzed" and disparaged.

A small convention will mean a feeble-voiced industry not yet marshaled for battle. Our problems awaiting National action are many. Our organizing is coming together. The convention will test it as nothing else has or can.

Individual businesses can run from a central office without conventions of the staff. But a marshaled industrial headquarters cannot. Whether or not members of a federated industry will come to its conventions is the test of whether or not they can federate for their common tasks.

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## *Green Apples—and a Price for Bread*

**A**LONG the motor roads leading out of every big city Mr. Farmer has built up his roadside stands. He offers green corn, apples, soft drinks, boquets, and garden vegetables.

We stopped for apples at one such stand and Mr. Farmer with a wicked grin filled a bag from a

bushel basket in the back of his stand. He did not take any apples from the inviting box in front.

You can guess the rest. At home when the apples were opened all proved to be bruised windfalls. If Mr. Farmer knew that he was not only "unselling" his own reputation but that of all roadside stands as well, what would he do for a policy? And what would his neighbors say to him? The answer to your question is ready found for you if you will only go to any store and get a cooperatively packed box of apples from the marshaled apple-growing industry. There an entirely opposite principle of merchandising prevails, for every apple is sold to sell its successor. Those in the middle of the box are as good as those on top.

And the apple growers who have federated and work in harness for the good of their industry are prospering. For bakers the apple situation has a moral. When will it become impossible for a baker to offer a bad loaf of bread for sale? And how?

Other industries are federating and marshaling their resources. We are slowly pulling to that end through endless friction and doubts that any so-far charted course is the right one. When we find a way to make the **QUALITY** loaf the only loaf we have to meet in competition we shall be far along on our way.



# As English Bakers See Us

*Visitors from Overseas Tell of Our High Speed Mixers and Other Marvels of Speed*

WE ARE writing this article at the conclusion of our seven weeks' tour of American bakeries, which took us through the biggest plants in New York, Philadelphia, Baltimore, Washington, Pittsburgh, Chicago, Minneapolis, Winnipeg, Toronto and Montreal.

The officers of the American Institute of Baking assured us that American bakers would like our impressions and field notes upon arriving home in England. So here they are.

Our objects in paying a visit to the bakeries of the United States of the U. S. A. and Canada were:

First,—“To see how the other fellow does it,” to use your own American phrase.

Second,—To learn all we could about our industry.

Third,—To meet the bakers of America.

The impressions, after our visit, and after having had time to reflect upon what we saw, are such that we found the trip of real educational value, and will certainly be a great asset in the management of our businesses on this side. As we entered your bakeries, and caught the first glimpse of the automatic plants in operation, we were led to exclaim “Some Bakery”. That, perhaps, was the first

thought that came into our minds, but as we were conducted through the various plants, we were soon to realize the importance attached to organization and control.

The things which were of greatest interest to us, were not so much the com-

pletely automatic plants and travelling ovens (these, of course, we have on this side), but rather were the high speed mixers, methods—sponging, doughing and fermenting processes,—and quantities, cooling and wrapping, along with the sales systems, and last, and probably the most important, the application of science in bread making as demonstrated by the fact that 75 per cent of the bakeries we visited had their own laboratories, and em-

ployed a university trained chemist, to analyze, examine and test all raw materials as well as the finished product.

## *High Speed Mixers And Scientific Bakery Control*

Three visitors from England fully believed dough could not stand the punishment of high speed mixers. They came—and saw and were conquered. Read this story of their conversion.

American scientific control in the industry startled them.

So did the American practice of adding much to wheat flour to obtain the American finished loaf. They called it “cake bread” in contrast to their own bread with its lack of shortening, malt, sugar, and milk.

They have gone home to leaven their own Industrial standards and to work for a bakers' college with our own American Institute for model. They want to back their own Prof. Jago as American bakers have backed our Dr. Barnard.

## *High Speed Mixers*

But to take these in the order in which they are mentioned. First, then, the High Speed Mixers. We must confess that at first when we saw these machines in operation that we were very uncertain as to the effect they would have upon the

dough. We always thought, that whilst a dough should be thoroughly mixed and cleared, it should not be handled too roughly, or the dough would consequently suffer, and to think of the blades of a mixer revolving at the rate of 60 to 70 revolutions per minute, seemed to be entirely opposed to the principles we had been taught.

But when we saw so many machines in use, and the resultant bread, our doubts were dispelled, and we had to say that the HIGH SPEED MIXER IS THE LAST WORD IN MIXING MACHINES, at least from the American point of view. Whether these machines would serve the British baker as well as they do the American remains to be seen, for we think this ought to be taken into consideration, that there is certainly a difference between the flours used on your side and ours; your's, we should say, being considerably stronger than our's, and therefore standing more work during the doughing process. This point can only be answered by experiment.

Now to turn to the second point of interest, viz.:—Methods—Sponging, Doughing and Fermenting Processes, and Quantities. Your methods of manufacture are very much similar to our own, but we did notice slight differences. For example: in the Sponge Doughs, after a 5 hour sponge, only 15 to 30 minutes is allowed for fermentation after doughing. This led us to ask the following question: "Can the gluten in the added flour be sufficiently matured in so short a time?" but the resultant bread indicated that there had been quite sufficient fermentation, and did not show any harshness in the crumb indicative of under proof. The use of Milk, Shortening, Malt Extract and Sugar is far more extensive in America than it is on this side, so much so that we call

the type of bread baked in America—"Cake" Bread.

### *Our Cake Bread*

Here is an average English recipe which might interest your readers by comparison with their own:

280 lb. Flour (Sack).

160 lbs. Water.

3½ lbs. Salt.

1 lb. Malt Extract.

2 lbs. Yeast.

2 lbs. Shortening (When used).

Straight Dough.

3 hours to board.

Well kneaded after 2 hours.

Temperature of dough, 82° F.

The flavour of American Bread seemed to us to be to some extent artificial, the wheaty flavour being somewhat hidden by the added ingredients. On the other hand we are prepared to admit the extra food value obtained by the addition of milk, etc.

### *Warm Up to Our Coolers*

Thirdly. Automatic Cooling and Wrapping. As you know, wrapping bread has not been the custom in this country, but recently the Wrapped Loaf has been introduced, and we feel that very soon will be demanded by the public. Already in certain towns Public Health Officials are advising people to buy the loaf which is wrapped. As we realized this position, we were out to learn all we could of the cooling and wrapping systems. We saw two kinds of automatic coolers, as well as various wrapping machines, and were very much impressed with the efficient method which has been applied. We have learned a great deal upon this point from what we saw, which will certainly be very useful.



### *Sold on Our Salesmen*

Fourthly. Sales Systems. The American Bakers attach great importance to the selling side of their businesses, and wisely so. Backed by a good product, an efficient sales system is the high road to increased business. We found some very elaborate systems in operation, which must surely have proved worth while or they would not be continued. Competitions amongst Salesmen, Sales Talks, and many other such ideas have the advantage of keeping the Salesmen interested and keen, which is all to the good of trade.

### *Laboratories Startle*

And now to come to the last and most important thing of all: Applied Science in bread making through the medium of the laboratory. We think that this left the greatest impression of all on our minds. It shows to us that the American baker has given up the old rule of thumb methods, and has determined on real scientific control of his industry. This is as it should be, and must certainly be one of the reasons why the baking industry of U. S. A. has climbed in the last 18 months or so to be the seventh in the list of important industries. The importance of this scientific control we fully realize, and we might say, it is being developed in this country, though not to the same extent as in U. S. A. and Canada.

Our National Association of Master Bakers will give analytical reports upon any article sent in for examination, but we know of very few instances indeed where a fully trained chemist is employed by a baking company for dealing exclusively with its own raw materials and product. In connection with this point, we were very interested to visit baking firms who have flour milled to their own specification, in respect of moisture, gluten and ash content.

To know just what one is using, its characteristics, etc., is a good start in the manufacture of a good uniform product, and that, after all, is the chief object of the modern baker, that his loaf should be consistently of the highest quality.

### *Like Our School and Dr. Barnard*

We should not like to close these impressions without a mention of the American Institute of Baking. We were unfortunate in that we visited the Institute before the school had been commenced, but we were told of the comprehensive course of instruction in every department of the baking industry. Every American baker has surely heard of it, and the best we can say for it is, that if we lived in America we should not be satisfied until we had taken the bakery course. The research department and the Bakers' Service Department are also doing wonderful work, from which the industry will certainly reap great benefit. The modern baker has ceased to belong to what used to be a despised trade, for not very long ago a man was almost afraid to own he was a baker, but to-day, he is proud of his trade, and has the greatest pleasure in saying that he belongs to the most important industry in the world, namely, supplying the people with their greatest necessity—BREAD. For this position we have to thank our schools of baking, and also such men as Dr. Barnard on your side, and Dr. Jago on our side.

J. A. BUTTERWORTH,  
WM. WARBURTON,  
GEORGE WARBURTON.

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### MAGAZINES WANTED

Can you furnish to complete sets of volumes for binding, No. 1, Vol. 16, 1921, of the Western Baker; and No. 7, Vol. 24, and No. 1, Vol. 26, of Bakers' Weekly?

### *An Article in Business*

BECAUSE the baking industry of America has a National home wherein is attempted the work of "registering on the American consciousness" the great recent strides in this industry, various writers now find it easy to obtain data where until recently none was to be had.

We may be weak within the industry, because our voice, as represented in the circulation of *Baking Technology*, reaches only a thousand bakers for every five thousand it should reach to be effective. But outsiders coming to our home marvel that a marshaled industry should have developed so fast and so far.

Fred C. Knemeyer, a writer on the staff of the magazine *BUSINESS*, expressed his wonderment at the things found at 1135 Fullerton avenue, at work for the welfare of the baking world. E. W. McCullough, manager of the Fabricated Production Department of the Chamber of Commerce of the United States, saw this article and here is what he had to say about it:

"I have just had an opportunity to read the article by Knemeyer and I wish THE ENTIRE ARMY OF BREAD CONSUMERS MIGHT KNOW WHAT YOUR ORGANIZATION IS DOING. It would not only give them great comfort and confidence in bread produced by large concerns, but I am also confident that the public attitude towards trade associations of the right kind would be more sympathetic. Most of our troubles originate through misunderstanding and the only way to help such a situation is the presentation of the facts."

This letter says a lot. Since it was written five different writers for National publications have obtained data in our National home for splendid articles. They will all do the missionary work for us that this one by Knemeyer did.

### *Bakers—An Outsiders' View*

JAMES FOUST, director of the Bureau of Foods of the Pennsylvania Department of Agriculture, sees food, including bakery products, from the standpoint of the consumers. There may be some point, therefore, in an opinion he voices to the effect that the baking industry, as he observes it, needs education along a certain line.

In writing that he is glad to know about the forthcoming great exposition at the Municipal Pier September 11 to 16, he says:

"Such a gathering ought to prove beneficial. Here in Pennsylvania the baking industry has been growing by leaps and bounds and in bread baking they have made wonderful progress. Few homes bake their own bread but many are compelled to BAKE THEIR OWN PASTRY, CAKES, AND THE LIKE. The baking industry needs education along the line of pastry and cake baking. They seem to have devoted their entire time to bread and to have neglected pastry. Of course there are exceptions, but such places are few and too far between. This is something for you to think about. Possibly you have been considering this phase of the industry."

Jay Burns is a baker who has combined cakes and pies with bread baking on a large scale. The cakes of some wholesale bakers in the east have become as well known as their brands of bread. But in Omaha Jay Burns has had a good chance to test out, in a sizable city, the effect of cake and pie baking as possible insurance against home bread baking, and as an opening wedge into new homes where baked products had not formerly entered. His view on this double-development of bakery practise would be interesting if he would take the time to write it out for us.



# Trusting the Thermometer

*Successful Cake Baker Says He Finds It an Important Secret of His Success*

**D**O YOU in your bakeries stand in awe of your thermometers and treat them with all the respect that you possess?

Do you know the tremendous differences that a bit of temperature can make in the midst of your doughs?

The greatest scientist of the modern world—the man who gave us our grip upon life, that enables us now to laugh at typhoid, yellow fever, small-pox, diphtheria, and even rabies, discovered the key to all these diseases by merely studying temperatures in dough batches and in beer vats. His was a search to cure sour dough and sour beer and sour wine. In his honor we call the control of ferments in milk, and in many other fluids a process of “Pasteurization.”

Back in the seventies he cried aloud to the world on many topics concerning which the world has not yet found out what he meant. The importance of the thermometer in the modern bakery was one of these.

Recently while visiting the bakery of Paul Stern in Milwaukee we were enjoying the many mechanical features of the most modern bakery that it is possible at this time to build, and in the midst of our journey through the plant we came upon some recording instruments.

When Paul Stern showed that a piece of paper could be weighed on one of them and that a lead pencil stroke could be written across the paper after which it would show the added weight of the pencil mark, many of those present thought that Paul Stern was the victim of a foolish enthusiasm. He had paid high for his machines, new and modern as they were.

But now comes from the town of Detroit to the National Home of the Baking Industry a young man of the mettle from which tomorrow's bakers must be developed.

This young man is a scientist—and a scientist having a key position in a baking plant which is making cake products famous in quite a number of cities.

“How do you account for the big growth of the Grennan cake business?” was a question posed at this visitor from the company's Detroit laboratories.

“An important key to our success,” he answered, “lies in our thermometers.

“Do you know how important we consider them? We think so much of their power to work weal or woe for us that we do not allow a single official of any of our plants whether in Chicago, or Pittsburgh or Minneapolis or Detroit, to go out and buy a new thermometer when he breaks one.

“We insist that every one be supplied from our central laboratory in Detroit and then we see that we ourselves test out every one most accurately before it is allowed to go into plant use. In the matter of temperatures that is one place we do not stand for the slightest taking of chances.”

And why is it so important?

Keene Richards, the chemist and industrial engineer, who made the assertion that the thermometer was of such supreme importance, could tell you exactly why. Louis Pasteur, the discoverer of yeast's real nature, also worked out the reason why, and Richards in 1922 repeated almost word for word Pasteur's pronouncement of 1870 in making his case.

Pasteur found some bacteria at work among animals, making them deathly sick, instead of manufacturing alcohol and carbon-dioxide as the yeast cells do in leavening bread. He found that these microscopic organisms could pass from a cow to a sheep and from a sheep to a pig—but they would not harm poultry. He tested hens to find why—and found their blood two degrees warmer than the blood of animals in general. Those two degrees gave hens immunization from the bacteria of the disease known as anthrax.

We know that for every harmful form of micro-organism there are hundreds of beneficial forms which do great work for humanity. And that every one of these works at some temperature in its best power. We know that as soon as that ideal temperature is abandoned the micro-organism works much less effectively, or abandons its task entirely.

So a big cake company with plants in four different cities wants its thermometers to be exact, and to always be on the job in control.

Mr. Richards pointed his conversation up into some of the unknown elements of fermentation. He had, of course, no use for self-rising flour, for he has learned to respect yeast plants for the flavors they make and the changes they work in flour proteins.

"If you think it is safe business to blow bread up with carbon dioxide gas," he said "just watch closely what the diastase, and protease and invertase of flour and yeast do to a leavening batch of bread. Taste bread that has fermented an hour less than some other bread. You will find a great difference in flavor. The flavor-makers have been at work in the dough just as yeasts work in wine and beer, giving them hundreds of different flavors according to the conditions of growth under which the yeasts have to work.

"We respect our yeast cells and what they do in our doughs and we want them to work under the best of conditions. We are always studying to see what new combinations of flavor they can bring about for us. Foolish bakers sometimes say they can "taste the yeast" in bread. They cannot. What they taste is the work of the yeasts, in the flour, just as the flavors of 325 different kinds of cheese are the work of bacteria and yeasts in the milk fluid and casein."

Mr. Richards told a very interesting story of the "clever rule of thumb men" whose era in the baking business is closing, he believes.

"They were honest and sometimes very clever," he said, "but they were as ignorant as they were honest and often got results varying far from the optimum.

"They had their counterpart among the millers. Sometimes we have received a fine batch of cake flour, from some small mill. We liked it so we would order a whole lot more, specifying that we wanted "the same flour as on our previous order."

A flour would arrive which would not accomplish any of the fine results of the former shipment.

Many times I have gone back to the miller, tempted to accuse him of fraud. But I have never found a fraudulent miller on such a search. I have always found a perfectly sincere and honest miller, who was simply ignorant. He didn't know what made the first flour so valuable to us. He had achieved its condition by some accident. He could not duplicate it or reproduce the quality. But we found what to him was a mystery through chemical analysis. So we were forced to move our business gradually over to mills under scientific control. They can deliver what is specified and can always know that they are doing it, and just why.



It is easy to quarrel with the view of Keene Richards,—but the point is his view is from one whose business “is on the go” and makes him happy as he watches his faith in scientific methods work out.

“If the bakers continue to use horse sense,” was his concluding remark, “the days when the baking industry is a one horse proposition will be gone and forgotten forever.” In a single case, he found a sincere salesman offering “cinnamon with an extra fine flavor” at double the usual cost. Test tubes in the laboratory disclosed that the product was only 25 per cent cinnamon and 75 per cent adulteration by other highly flavored products. The deceived salesman was shocked to find what he was selling and never again offered it after that day in the Grennan Cake Company’s laboratories. He himself had been taken in by labels and the “rule o’ thumb” method of determining standards.

### *Chain Stores—and the Bakers*

THE wisest baker is he, of course, who watches most closely the changing world in which he works. Chain Stores have entered the baking field for its weal or woe and they present one of its newer phases.

In one Pennsylvania district a chain store system having thirty or more stores constantly “peddles” its bread contract around from baker to baker, telling each one he can have it “for half a cent off” the prevailing price. Bakers have underbid each other for this system’s trade until the price is far down in the red side of the ledger and is a menace to the solvency of the baker holding it. But he fears to let go, thinking a turn in the flour market or some factory economy will enable him to bring the business into the ledger’s right side in the end.

In Indiana a chain store system took all its business away from a baker who spoke up for the upbuilding of home industries. It had stores in many other cities, just as almost all lines of merchandising have in these far-spreading days.

In Nebraska a “basket store” system and a “store-on-wheels” system both featured very cheap bread as a business getter for other lines. Bakers counter attacked with a war fund, spent in providing under-cost bread for regular grocers until the basket stores and itinerant motor-truck stores changed their ways.

One of the biggest chain store operators, who visited the National home of the baking industry this month, applied for membership in the American Bakers Association and announced that he was through with “premium bread;” that is, bread sold under cost to pull trade for other articles. He declared himself in favor of the Code of Ethics of the American Bakers Association, and of a selling policy that brought a fair margin of profit for his bread along with all other lines of merchandise.

In New York two chain store systems have taken to baking bread for themselves, one operating a bakery that is being enlarged constantly and the other supplementing his own production with bread from wholesale bakers.

We hope to have an article in the near future on the future of the Chain Store in bread manufacture as a big chain store operator sees it.

Wholesale bread manufacturers have sometimes expressed alarm over chain store competition with the frequent tendency to sell under cost to lure business. But when a wholesaler who works in the midst of the largest chain store systems in America was asked about this he only laughed at the idea. “Business never was so good for the wholesalers,” he said,

"as now, and chain store competition never was so pronounced. That is answer enough to alarms over this development."

In Washington C. I. Corby of the Corby Baking Co., has had a chance to observe chain store problems. In response to an inquiry about Washington's experience with them he writes:

"The chain stores in Washington do not open on Sunday mornings. Neither do the majority of our large individual stores, but the smaller grocery stores do open and then use this fact as an argument that customers receive better service. Our experience is that the live, wide-awake independent grocer is doing just as much business as he always has, and in a great many instances the chain stores have helped him as they have made him more wide awake and have put him on his mettle."

The chain store development seems to be one of those interesting growths that have not yet reached the final stages of advancement. The truth about it seems not yet known to anyone, in full, and therefore we would welcome comment from any part of America, for or against, where it has been under observation.

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### *Wanted—a Good Baker*

MANY bakers who have not yet gained a clear vision of the work that only a National headquarters can do for the baking industry, still follow "just as good as" plans.

One of these calls for the organization of the New England bakers into a solidarity of their own which will fly the New England flag, and send its own committees to Washington and keep its own paid manager on the job at a New England headquarters.

The strong conservatism of the section which once dominated all of America

without conscious effort at National leadership speaks in this movement. It was voiced at a convention held atop a hotel in Burlington, Vermont. From the convention floor Ticonderoga could be clearly seen, and so could Plattsburg. And so could the island in lake Champlain off which naval cannon first spoke on vessels flying the American flag.

But just as Ethan Allen was succeeded in the winning of the Revolutionary War by George Washington from Virginia, at the head of a consolidated American power, in which New England added a factor, so Plattsburg was succeeded in the World War by a mobilizing under Pershing of Missouri of every available American force, including all that New England had to offer.

In this reluctant sectionalism that would set local pride above National necessity and power, many bakers speak up against our baking school as an "improvident, rash adventure." They want none of their money put behind it. They want "those that go to the school and get the benefits to pay the bills—solely and alone."

O very well,—that kind of thing was formerly done by private initiative that sought to set up this or that group of bakers as the sole beneficiaries of the work for which they paid in education, scientific research, and improved merchandising methods.

A representative of the American Bakers Association was recently called to a Western town where five bakers were more or less in a panic. We happened to know one other baker there who did not share in the general grief.

Each of the five wanted a baker—and wanted to know if we could provide one. And we soon found "there was a reason."

The biggest bakery in the city was less than two years old. It was owned by a



business man who was not a baker at all. But he had obtained his baker from a private school, not operated for the industry at large but for one group only. This scientifically trained baker, skillful in the use of all modern machinery, and in handling flour storage problems, mold and rope problems, and supplies problems, was turning out a loaf of bread that your "rule-o-thumb" man could never approach.

The oldest bakeries in that section were losing trade—their biggest orders falling away almost overnight as the new competitor's bread won its way on its own merits. And did they scoff at a School for Baking whose graduates would be available to all—to them in meeting the suddenly changed conditions?

They did not. They called for trained bakers before our first class could receive its graduation diplomas, and they bowed low in deference to the new day in the industry that flooded them out of a leadership which had gone unchallenged for thirty years.

And should the National Headquarters of the baking industry fail a baker who calls out as does the Star Bakery of a certain Northwestern town: "We need a real bread man and will pay well for the right party. We are only a small bakery but we will grow if we make the right bread. Can't you recommend a man?"

We could recommend a man if we had forty or fifty more students entering the baking school. For there is a strong demand with a very scant supply of the right kind of men. And the demand seems to be growing faster than baking school graduates can be supplied. One of the first to be graduated has just been made general manager of a large bakery after eighteen months as a subordinate in charge of its laboratories. He won his way under most careful observation by his employer.

## *Express Company Wages and Their Bread Rates*

IN A WORLD where nearly all vital problems are in a "fluid" state, those who attempt to run affairs by fiat pronouncements, get themselves into some sad predicaments.

It was all right to figure out "cost plus" as a basis for government contracts but as soon as contractors found they needed the "costs" to get the "plus" dollar-an-hour water boys became the rule and not the exception in such places as shipyards and machine shops. And thus all wage standards were demoralized.

It was all right to pay machinists for the railroads 68 cents per hour wherever they might work, but the machinist in Portland, Me., with \$20 coal and zero weather found his wages were shabby indeed compared to those of a similar workman in Pasadena, Cal., paid exactly the same in cash. And discontent was bred instead of industrial peace.

To enforce standard wage rates, universal to certain labor classifications, the government sent out many "field investigators" during the war. By its same "fiat" policy it made a fiat rule that each investigator could charge only \$4 per day expenses. At the same time dollar meals on government operated railroads were wiped out and the \$4 per day would not buy a government man's meals on its own railroad trains let alone pay for lodgings in hotels with \$5 minimum rates as well. That little rule is remembered as the nightmare of many a government man during the war.

Now it is the turn of the bakers of America to pay a pretty penny for "fiat" wage conditions. By being able to show the conditions of the labor market at the moment of maximum war disorganization, the express company workers were able to

get an award from the U. S. Railroad Labor Board granting them a raise in pay, equivalent to a raise of  $13\frac{1}{2}$  per cent in express rates.

The raise in express rates was duly ordered, although two previous raises had been made just prior to this date. Consumers were to be allowed to pay the bill under the then prevailing policies.

But the "flat" wages still go on although the war tide recedes from all lines of industry responsive to trade conditions. Express companies insist that about 70 per cent of their costs outside of railroad charges consist of the wages paid to express handlers. THESE WAGES ARE NOW ABOUT 50 PER CENT HIGHER THAN ARE PAID TO WORKERS IN SIMILAR LINES OF INDUSTRY.

Since a fiat order keeps them from flowing with the wage tide, the only thing to do is to seek another fiat pronouncement that will bring them down to what now is reasonable, and obtain a reflection of this reduction in express rates.

For this reason the American Bakers Association is applying to the U. S. Railroad Labor Board for a rehearing on express employees wage rates. If the Board reassumes jurisdiction it may be possible to start these rates downward towards their pre-war status.

### *Prayers at the Dough Troughs*

MANY bakers bake bread in many ways, but where do you know bakers who stop their doughs half punched for daily prayers? At Zion City, Illinois, they do something like that. Zion is served by a big bakery owned by the community. A visitor saw its staff of workers start up the mixes at 7 o'clock A. M. And then at 7.15 o'clock, in response to a signal gong, all marched to the bakery chapel

where there was organ music, prayer, and bible readings. At 7.30 the bakers marched back to the dough room and punched the time clock, taking out for the time spent in devotions.

### *I Like Americans—Their Bread*

I like Americans.

They are so ridiculous.

They are always risking their lives to save a minute.

The pavement under their feet is red hot.

They are the only people in the world who can eat their soup without a sound as of the tide coming in.

They sell their bread hygienically wrapped.

The Europeans sell it naked.

They carry it under the arm.

Drop it and pick it up.

Beat the horses with it.

And spank the children.

They deliver it at your apartment. You find it lying outside your door on the door mat.

NANCY BOYD,  
in Vanity Fair.

### *A Baker Who Learned*

MANY bakers terribly resent the idea they have anything to learn past the front doors of their shops.

The proprietor of Classler's Niagara Falls Bakery is not one of these. He didn't just like the looks of his loaf and sent samples of it to our service laboratory. His fermentation conditions were found to be wrong.

"Might say we have changed our punches in line with your recent suggestion," he writes under date of August 7, "and seem to be getting a much better looking loaf."



# Better Bakery Sanitation

## *A Report on a Year of Progress in Applying Modern Methods*

By DR. WM. C. WITTE

*Passed Assistant Surgeon, U. S. Public Health Service, Assigned to Survey the Baking Industry at the Request of the American Bakers Association*

AT the last annual convention of the American Bakers Association there was adopted a sanitary code which was drafted after a complete study of existing state and city laws and ordinances. With the adoption of this code it was decided to organize a Sanitary Service for the purpose of studying the existing sanitary conditions of the baking industry and to raise the sanitary standards of the highest level, thereby assuring the consuming public of the production of a clean and wholesome product. The United States Public Health Service was asked to assist in this work and did so by detailing one of its commissioned officers to cooperate with the American Institute of Baking. A program of action was decided upon, the essential points of which were:

1. Sanitary survey of bakeries throughout the U. S.
2. Study of Health Hazards of Baking Industry.
3. Development of cooperation between Baking Industry and State and City Sanitary Officers.
4. Maintenance of Sanitary Service for assistance to bakers in trouble.

It was thought best not to organize an inspection service as bakeries are being inspected by existing law enforcement departments and additional inspectors would be undesirable. It was therefore decided to secure, if possible, cooperation from State and City Departments and through them conduct the sanitary surveys. A blank was devised, complete in detail, upon which reports of exact sani-

tary conditions could be reported and a circular letter was addressed to State Departments, asking for their cooperation. The results from this were especially gratifying, as only seven states stated that they could not cooperate, giving as their reason one of the following: not legal, insufficient appropriation, insufficient personnel or inspection reports considered entirely confidential.

Reports have been received from fifteen states and show sanitary scores ranging from 39% to 96%; 21% of the total were scored less than 70%. The outstanding deficiency was poor personal hygiene of workers. None of the bakeries surveyed was making a study of absenteeism although a number reported high labor turnover; 89% of the bakeries surveyed were given demerits for poor construction of buildings; 64% did not have proper provisions for storing their raw materials; some reported evidence of rodents and a large number reported insect pests. It was surprising the number of bakeries which were not maintaining laboratory supervision of their raw materials.

The general sanitation of work rooms was scored as fairly good; some plants reported considerable flour dust present. It was interesting to note that practically all bakeries surveyed were using some machinery and in most the entire process was machine in character.

### *Personal Service Facilities*

Personal Service facilities were very incomplete and a great number reported

use of common towels. Rest rooms and supervised recreation periods were apparently not in vogue. In only a few bakeries was there reported any systematic physical examination of workers or medical supervision of employees. From the above report and a study of the literature, it is obvious that some improvement has been made in bakery sanitation. Conditions today are better than they were twenty years ago. However, there is still plenty of room for improvement and more thought on the part of bakery owners should be given to sanitation.

Bakery sanitation is necessary for two reasons:

1. Protection of product.
  - (a). From contamination and spoilage.
  - (b). Protection of public health.
2. Protection of health of bakery workers.

Protection of product requires the purchase of raw materials which are uncontaminated and which are of a high standard of purity. The proper storage of the raw materials to prevent development of insect pests and the harborage of rodents is also necessary. Chapman in Bulletin No. 198 of University of Minnesota Agricultural Experiment Station discusses in detail the control of insect pests, he shows how the business of the baker is injured by insects in flour and other raw products that contaminate his finished product. He states that insects are usually brought into bakeries with the flour and he stressed the necessity of the cleaning of flour sacks and bakery cleanliness in general.

The depredation of rodents is well known and the need for extermination of them in the storeroom is obvious.

Molds and rope are the result of insanitary practices in bakeries. The study of the source of molds under the direction of Dr. Prescott by Streider & McClellan

brings out very forcibly the necessity of modern sanitary practices if these plagues are to be overcome.

Insect pests, rodents, molds and rope are unnecessary, are preventable and are very expensive to the baker. Clean shops, clean workers and sanitary practices will do much to overcome them.

The baker also knows that the public is thoroughly aware of the danger of contracting disease through its food supply, and he must realize the essentials necessary to the proper protection of his products.

No mention is being made in this report of the service rendered bakeries concerning correction of insanitary practices and suggestions made for improvement of conditions.

The relation of the baking industry to the health of bakery workers, in other words, the health hazards of the industry, is a subject upon which much more study should be done.

### *Inquiry to Insurance Companies*

An inquiry was addressed to four of the larger insurance companies regarding the insurance risk of workers in bakeries. One company reports "while the losses indicate that they are hazardous as compared with most of our selected occupations, we do not make any particular extra charge for them." Another reports that they consider journeymen bakers as only fair risks and offer standard insurance to only the best. Still another reports, "There is a general impression that the mortality among working bakers is high because of the confinement and of sudden changes in temperature to which they are subjected." The other company reports, "With regard to the attitude of insurance companies, we would say that so far as we know, most of the



large insurance companies do not charge an additional premium for bakers nor do they have any special provisions in their policies for any known hazard among bakery employes."

The statements of these insurance companies is based on experience tables compiled by their various companies or special investigating committees, showing the relation of actual to expected deaths. It must be borne in mind, however, that the experience is based on selected risks, men who were physically up to a certain standard at the time of the issuance of the policy.

In a report prepared by Louis I. Harris, M. D., Director Bureau of Preventable Diseases, Department of Health, New York, and Louis I. Dublin, Ph. D., Statistician Metropolitan Life Insurance Company, regarding the Health of Food Handlers, published in 1917, the following conclusion appears: "The bakers show a comparatively marked frequency of respiratory disorders. This condition may be due to the unfavorable location of work places, which in many instances are underground. Many disabilities from tuberculosis may have been developed from asthma, chronic bronchitis, and emphysema, which are observed so commonly in general clinical and hospital practice among bakers." In the same report a table showed that there were 274 bakers examined; 207 showed some disease or defect and only 67 were entirely free from disease or defect.

The most common condition found was pharyngitis, 50 cases. There were also 30 cases of organic disease of heart, and 33 cases of anemia, 85 cases of poor oral hygiene, and 29 cases of pulmonary emphysema. It would appear, therefore, that the physical condition of bakers as shown in this study was not good.

### *Hazards of the Industry*

The U. S. Department of Labor, Bureau of Labor Statistics, Bulletin No. 306, April 1922, entitled "Occupation Hazards and Diagnostic Signs" notes the following hazards of the baking industry:

1. Sudden variations of temperature which are responsible for congestion of internal organs, catarrh, neuralgia and rheumatic affections, pneumonia and Brights Disease.

2. Organic dust responsible for dryness of nose, throat and mouth, cough, asthma, bronchitis, emphysema and tuberculosis.

3. Carbon monoxide gas which might arise from faulty oven conditions would cause headaches, dizziness, fatigue and general weakness.

Hirt quoted some German statistics to show that the mortality among bakers was more than 42 per cent from respiratory diseases; emphysema, chronic bronchitis and asthma being most common. The conditions above referred to are attributed to flour dust, which by some investigators is considered quite soft and not particularly irritating.

In our surveys of bakeries we have found flour dust quite abundant in blending rooms, around sack cleaning machines and in mixing rooms. In shops where considerable bench work is done, flour dust is abundant in the make-up room.

Injuries among bakers are not considered very numerous as compared to other occupations, but are considered important by most bakery owners because of the requirements of the workmen insurance laws which provide for compensation to injured employes. With the installation of machinery the number of injuries increase even though precautions are taken to enclose all moving parts. The most serious injuries are found in the mixing room or around the divider. There

are several fatal accidents of this character on record.

The hours of employment in bakeries has some effect on hazards in that most of our survey reports show nine and ten hour work days which will increase fatigue and they also show that considerable of the work is done during night hours.

The difference of opinion regarding the health of bakers, the controversy regarding the dangers from flour dust, and the mortality statistics which show high percentage of death from respiratory diseases among bakers would indicate that further study should be made. To this end, we are establishing an absenteeism study in a number of plants and would suggest periodical examination of workers, especially before employment and previous to reemployment following absence on account of sickness.

### *Summary and Conclusions*

1. There has been a marked improvement in bakery sanitation within the last ten years, especially since installation of machinery.

2. Bakery sanitation is indicated because of protection afforded product and protection from disease and injury of bakery employes.

3. Further study is necessary to show present status of hazards of baking industry.

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### *The Home Made Loaf*

GOVERNMENTS made by man still try to do the foolish thing of wishing women back to their kitchen bread pans. They do not know that this is as impossible as wishing men back to the days of spooners' buggies with self-driving horses, or the days of sword-carrying gallants.

But women know what the governments do not try to teach them. Take, for instance, the view of Miss Mary Ensfield, Commissioner of Schools of Kalamazoo, Michigan. Miss Ensfield not only won her political position in the public life of Kalamazoo by virtue of being a woman in politics, but she won it against another woman candidate in a fair field for all.

And Miss Ensfield laughed at this effort to keep women at the kitchen bread pans.

"It is important," she said to the editor of this paper, "for women to welcome every advance in machinery that releases them from drudgery. I attribute much of my success in getting into public life to the fact that it has become possible to obtain things for the home without the drudgery our mothers knew. The days when they slaved over many things machines now do for them I hope are gone forever.

Miss Ensfield, it happens, is a teacher of our coming generation. How much more sane she is on this one topic than our well known Department of Agriculture which urges all women to write in for formulas by which it is willing to suggest they can make home-made bread at  $7\frac{1}{3}$  cents per loaf, for good bread, and  $4\frac{1}{2}$  cents a loaf for plain yeast-and-flour bread.

The dear government even suggests that its experimenters used "dried yeast, bought their flour by the barrel, omitted shortening, and did the baking on a kerosene range." That was for the  $4\frac{1}{2}$  cent loaf.

What housewife would be attracted by such a prospect, when modern machines can do what modern baking machines are doing to unsleave women from the kitchen.



# Molds in Bakeries

Part III of a Report of work done for the American Institute of Baking by J. W. Strieder and R. N. McClellan under the direction of Dr. Samuel Prescott, head of the Department of Biology and Public Health of the Massachusetts Institute of Technology.

On the second of September, 1921, a general survey to ascertain the relative humidities of the different establishments was made with the following results:

	Humidity Temperature	
	Degrees	Degrees
	Fahrenheit	Fahrenheit
No. 1 in the workroom.....	60.4	86
No. 2 in the workroom.....	69.2	83
No. 3 in the workroom.....	63.4	86
No. 4 in the workroom.....	55.0	..
No. 5 in the workroom.....	61.2	88
No. 5 in the basement.....	64.8	82
No. 6 in the sponge room....	65.6	84
No. 6 in the mixing room....	68.4	84.3

No. 6 in the dough room.....	64.6	84.4
No. 6 in the conveyor room...	65.4	85
No. 6 in the making up room	65.2	85.2
No. 8 in the oven room.....	54.4	89
No. 6 in the shipping room...	52.1	91.5
No. 6 in the basement.....	57.2	87
No. 8 in the workroom.....	65.6	84
No. 9 in the workroom.....	53.4	91

These results were obtained using a wet and dry bulb thermometer, degrees Fahrenheit. A graph has been made to show the divergence between shops and even within shops on a given day and under practically the same conditions.

Name Bakery .....Date .....  
Address .....Remarks .....

	Perfect	Allow								
		1	2	3	4	5	6	7	8	9
1. Above ground .....	10	10	0	10	7	10	10	10	10	10
2. Well lighted .....	10	7	2	8	7	8	10	10	9	7
3. Well ventilated (artificial).....	5	5	0	3	3	5	5	5	3	5
4. Unconnected by door or hall with living room or room used for other business..	5	5	2	5	5	5	5	5	5	5
5. Screen, 2; free from flies, 3.....	5	3	2	3	5	5	5	5	2	4
6. Floor, walls and ceilings clean (deduct 5 for spitting on floor).....	10	4	2	10	6	7	10	8	5	4
7. Water-tight floors .....	5	5	5	5	5	5	5	5	4	5
8. Water closet does not open into room in which food is handled.....	5	5	5	3	4	5	5	5	5	5
9. Basin for washing hands, sanitary plumbing .....	5	2	3	4	4	4	5	5	4	4
10. Employees wear clean uniforms, 2; free from disease, 3.....	5	4	3	5	4	4	5	5	4	3
11. Utensils, mixers, dough troughs and racks clean .....	10	6	7	10	8	10	10	10	7	6
12. Protection of raw materials.....	5	2	1	4	3	4	5	5	4	4
13. Handling of products in manufacturing...	5	3	4	5	4	4	5	5	2	2
14. Mechanical mixer .....	5	5	5	5	0	5	5	5	0	0
15. Handling final product.....	5	4	2	4	4	4	5	2	3	3
16. Bread wrapped in bakery.....	5	0	0	0	0	0	5	4	0	0
Total .....	100	70	43	84	70	85	100	94	67	67

### INFECTION DUE TO INGREDIENTS

Believing that the primary source of mold infection lay in the ingredients used in the manufacture of bread, steps were taken to examine these ingredients as possible carriers of mold spores. Flour, being the ingredient used in largest amounts, received the most attention along these lines, but yeast was also included along with other materials. It may be stated at this point that practically every ingredient of bread, with the exception, perhaps, of the shortening, is likely to contain large numbers of microorganisms, and especially bacteria and mold.

In studying the yeast, the cakes were diluted in sterile water and, using wort agar and the plate and platelet technique, the samples were permitted to germinate. The platelet method is used in obtaining pure cultures and consists of placing drops of the medium on the sterile dish instead of pouring the whole plate. On the whole, yeast is not badly infected with mold. These experiments showed molds to be present but not to the extent of any heavy infection, such as is found in flours.

The flours were examined in the following manner: Samples of the flour were placed in sterile Petri dishes, and mixed with sterile water, using a sterile spatula. When thoroughly mixed, the plates were kept at room temperature and observed from day to day. The reaction taking place in a typical flour, when treated in this manner, is somewhat as follows: First day, no change; second day, the mixture has a cheesy or yeasty odor, and gas bubbles demonstrate that fermentation is in progress. The mass is yellowish orange in color. The beginnings of fruitless mycelia are observed. Under the microscope yeast cells were evident and *Bacterium lactis* was thought to have

been observed, although not verified; third day, the sample has a cheesy, rancid odor, black and green molds (*Rhizopus* and *Aspergillus*) in evidence and red spots and yellow spots develop; fourth day, the plate has a putrid, musty odor and is practically covered with fungus growth.

Ten different samples of flour were examined in this way and all showed heavy infection with molds. The types most frequently encountered were *Rhizopus nigricans*, *Aspergillus glaucum*, *Aspergillus ostianus*, *Aspergillus candidus*, and *Penicillium glaucum*.

The gluten was separated from the flour and inoculated with mold and the remaining portion of the flour treated likewise. The growth on gluten was slow, and not characteristic, while the growth on the starchy portion was heavy and normal.

Heat treatment was tried in an effort to sterilize the flours. Flours subjected to dry heat at 160-170° C. for a period of one hour became dextrinized. *Penicillium glaucum*, when present, survived. Trying a lower temperature for a longer time, flours were heated at 130-140° C. for 85 minutes. These did not dextrinize, but as before, *Penicillium glaucum* survived. This work and subsequent work showed that sterilization of flours is impractical, and, as shown later, unnecessary.

### EXTENT OF INFECTION OF LOAVES

To determine the extent of infection on loaves offered for sale, it was decided that the best and most obvious method would be to permit such loaves to mold spontaneously. Accordingly, loaves were collected from different bakeries as they were about to be sold, and taken immediately to the laboratory. Some of these loaves were placed under sterile bell jars in an atmosphere highly saturated with water vapor so as to furnish the



optimum conditions for the development of molds. They were also shielded from the light, as this is another factor which influences the growth of mold fungi.

During the summer months the mold colonies appeared on all loaves within two or three days. The amount of infection was approximately the same in all cases where the degree of sanitary excellence was nearly on a par, but those bakeries having a low degree of sanitary excellence showed a heavier infection. The infection in summer was heavier than in winter. This is due to the greater amounts of dust, fly nuisance, and method of handling, as well as other factors. In winter the development of molds is slower, oftentimes a period of six days elapsing before the first appearance of mold structure.

Plate exposures were made at various points in the different plants (using a 2% dextrose agar which was found to be best for mold culture) in order to ascertain the extent of infection due to the air, and to discover the correlation, if any, between types carried in the air, and the types appearing on the loaves.

The results of these experiments showed that the types in the air and the types on the exterior of the loaves were identical. The types (genera) are *Aspergilli*, *Penicillium*, *Rhizopus*, and *Mucor*. Experience showed that *Mucor* occurred very rarely in winter, whereas it was frequently encountered during the summer work, *Rhizopus* and *Aspergillus* being met most often.

A phase of the work which afterwards proved fruitless in the light of later work, was the examination of different portions of the individual loaf. Loaves were collected and different portions such as "center of loaf," "side center," "under crust" and "crust" were incubated in sterile Petri dishes with sufficient sterile water to encourage the generation of

molds. It was found that without exception all of these portions developed molds. However, examination of the loaf at the center, the exterior of which was completely covered with mold, showed no mold growth. The mold seemed to start at the exterior and by a process of ingression of the hyphae advance toward the center. There was no initial growth at the center. But the plated samples of the centers of loaves showed infection of the centers. These two results were conflicting and at variance with each other. However, the plated samples may have been open to infection through faulty technique or other source, whereas the unopened loaves left no such possibility for contamination. The point to be determined, then, was the completeness of sterilization of the loaf by the baking process, and steps were taken to determine this point.

#### STERILITY OF THE BAKED LOAF

On the determination of this point, more time was allotted, perhaps, than to any other one phase of the investigation, because it was deemed of such importance that a decisive conclusion on this point must be reached before going further with the work.

Loaves were collected directly after they left the oven, and, handling with aseptic precautions, were placed in sterile tin containers especially constructed for this purpose. These loaves have been kept for varying periods under these conditions and even at the end of three weeks the loaves showed no evidence of mold infection or growth on the exterior or in the inner portions.

Other loaves were collected and handled in the same manner but on reaching the laboratory they were coated with a film of paraffin by dipping in melted paraffin at 55° C. At the end of three weeks the coating was cracked off and the loaf exposed with the following observations:

There was no evidence of mold infection in any part of the loaf.

There was very little loss of moisture, the bread being very palatable.

The taste was practically normal, though a slight acid taste was noticed.

Inoculations into litmus milk gave coagulation with acid. (See later for bacteria).

There follows some of the data from the experiments performed to ascertain the sterility of the loaf.

1. Two loaves were collected in sterile containers and kept for five days.

External appearance—no mold growth

Internal appearance—no mold growth

Six portions of the crumb were placed with aseptic precautions in sterile Petri dishes and sufficient sterile water added to make mold growth favorable.

1 day—no mold growth

2 days—no mold growth

3 days—no mold growth

4 days—no mold growth

5 days—1 plate showed *Rhizopus*

6 days—2 plates showed *Rhizopus*

2. Four loaves were collected as above and examined at the end of four days.

External appearance—no mold growth

Internal appearance—no mold growth

The centers of these loaves were plated in sterile Petri dishes as before, 20 plates being made.

24 hours—no mold growth

48 hours—no mold growth

72 hours—3 plates showed *Rhizopus*

96 hours—4 plates showed *Rhizopus*

120 hours—5 plates showed *Rhizopus*

144 hours—5 plates showed *Rhizopus*

The plates showing mold growth were not from the same loaf.

The appearance of mold growth on these plates was viewed with suspicion. It could not be decided whether this mold had survived the baking temperature or

appeared on the plates due to faulty technique, since the laboratory itself had previously given evidence of infection of the air by molds to quite a large extent.

Accordingly, steps were taken to decide these facts, and as a matter of general information, the temperatures at the center of a loaf during baking were determined by thermo-couple measurements.

3. The procedure followed in taking thermo-couple measurements of the centers of loaves was worked out along the usual methods involved in this type of temperature work.

The hot junction was inserted in a glass tube which was sealed at one end and bent almost at a right angle. The closed end was inserted in the dough so that the junction was approximately at the center of the loaf, and that left of the angle parallel to the bottom of the pan. The object attained in bending the tube was to insure a larger portion of the junction being in more exact proximity with the center.

The pan was then put into the oven, the leads being taken out through the door in asbestos coverings. The cold junction was an uninsulated bottle containing water and stoppered with a rubber stopper perforated by a centigrade thermometer. The readings were taken from the scale of a millivoltmeter. For the purpose of refreshing the fundamental facts concerning the thermo-couple, it might be well to give a brief explanation here.

When two different metals are joined together in a circuit, and one junction is heated, an electromotive force is in general produced which tends to drive a current in a certain direction, and this electromotive force increases as the difference in temperature between the two junctions increases. A millivoltmeter suffices to measure the electromotive force



generated by heating one junction, and it may be calibrated to read temperature directly. The thermo-couple is valuable on account of its sensibility, quick response to temperature changes, and the small size and mass of the part which must be heated as compared to the bulb of a mercury or a resistance thermometer.

The following data shows the temperatures of the four best runs of a series made on a sponge process loaf which, baked, weighs one pound five ounces, and is made from  $1\frac{1}{2}$  pounds of dough. It is baked in Durkhop ovens in the front row and the oven temperatures ranged between 30° F. and 420° F.

Time Min.	Temp. °C.				
	1	2	3	4	Av.
0	26.5	20.5	28.8	29.0	26.2
4	33.2	39.5	29.3	34.8	34.2
8	40.5	52.5	32.5	43.0	42.1
12	50.2	66.0	37.3	57.0	52.6
16	65.5	80.7	53.1	76.5	68.9
20	82.5	91.0	74.5	88.7	84.2
24	92.2	94.3	89.5	94.0	92.5
28	95.0	96.4	92.4	95.5	94.8
32	95.5	96.7	92.7	96.8	95.4

Maximum thermometers placed in the centers to check the final readings registered 96.5° C. and 97.0° C. respectively.

The following technique was worked out and used in connection with the problems of the sterilization by the baking process.

Into sterile Erlenmeyer flasks containing 10 cc. of 1% NaCl solution, sufficient flour was added to stimulate the consistency of dough as it enters the oven. These flasks were heavily inoculated with pure cultures of molds of the general *Penicillium*, *Aspergillus*, and *Rhizopus* types and plugged with sterile cotton plugs.

The flasks were immersed in water at about 20° C. and, following the curve obtained by thermo-couple measurements

of the temperatures at the center of the loaf, as nearly as possible by controlling the temperature, the water was brought up to boiling in a period of 35 minutes. The flasks were permitted to cool over night in the water, and were then incubated at 37° C. to permit the development of any spores that might have survived.

Result: No mold growth was obtained in any of the flasks, showing that no mold spores had survived the treatment.

4. Since *Rhizopus* was the only mold that appeared on any of the plates containing the crumb of the loaves in the foregoing experiments, the following study of temperatures at which this mold ceases to live was made. The baking temperatures at the center of the loaf as previously determined, reach 97° C. and are above 80° C. for 12 minutes or longer.

The death point determinations on *Rhizopus* were made by inoculating the mold on sterilized bread cut from the center of a loaf. The bread was of such size as to fit into a Petri dish and was then sterilized in the autoclave at 15 pounds for 20 minutes. The table below shows the results:

Temp. °C.	1 d. 2 ds. 3 ds. 4 ds. 5 ds. 6 ds.					
	1 d.	2 ds.	3 ds.	4 ds.	5 ds.	6 ds.
105	—	—	—	—	—	—
100	—	—	—	—	—	—
95	—	—	—	—	—	—
90	—	—	—	—	—	—
85	—	—	—	—	—	—
80	—	—	—	—	—	—

Three controls (no heat treatment) showed abundant growth of *Rhizopus*.

5. Three loaves were heavily inoculated with *Rhizopus* before being placed in the oven. They were collected and maintained under sterile conditions in containers.

At the end of five days one loaf was examined. There was no evidence of mold growth on the exterior. That portion of

the center containing the inoculation was plated in six Petri dishes and sufficient sterile water added so that, should there be any live spores, favorable conditions for growth would be present. Results:

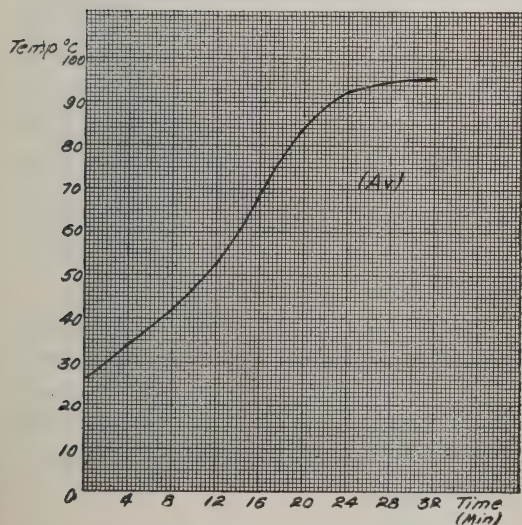
- 2 days—no growth
- 3 days—no growth
- 4 days—no growth
- 5 days—no growth
- 6 days—no growth
- 7 days—no growth

At the end of seven days a second loaf was treated as above. Results:

- 2 days—no growth
- 3 days—1 plate showed Rhizopus
- 4 days—1 plate showed Rhizopus
- 5 days—1 plate showed Rhizopus
- 6 days—1 plate showed Rhizopus
- 7 days—1 plate showed Rhizopus

At the end of two weeks the third loaf was examined as those before. Results:

- 1 day —no growth
- 2 days—no growth
- 3 days—no growth
- 4 days—no growth
- 5 days—no growth
- 6 days—no growth
- 7 days—no growth
- 8 days—no growth



Average increase in temperature of loaves of four bakes during baking.

This series of experiments proved conclusively that mold spores do not survive the baking temperatures and that the rare cases in which the presence of *Rhizopus* was observed are due to outside infection due to the contamination by spores in the air in the process of plating. Thus we believe that the sterility of the baked loaf, as concerns mold, seems to be an established fact.

(To be continued.)

### Pointers That Were Seen

To the Editor, Baking Technology:

There are so many good pointers and suggestions in your issue for July 15 that we would like to have you send thirty copies of this number for distribution among our shop employees. Yours truly,

REGAN BROS. CO.,

Minneapolis, Minn.

This letter is brief but it tells a lot that is pleasing to editorial workers who have merely tried to listen in on what was afloat in any corner of the industry and broadcast it for the use of all whom each individual item might concern.

The baking industry has a long ways to go before it becomes a marshaled industry and takes its rightful place as the largest industry in the United States instead of the seventh in size, but alert interest such as Regan Bros. show will do more than anything else to press it forward.

### From Alabama

WE enjoy Baking Technology down here. The other day Roy stated to me that he thought it was the best thing ever gotten out for the bakers and continues to improve. We read it from cover to cover.

GORDON SMITH,

Smith's Bakery, Mobile, Alabama.



# A Federal View of Bakers Bread

*New Report of the Committee on Standards, Department of Agriculture,  
Standardizes Various Loaves*

TO HELP bakers make a quality loaf of bread, which can be described so that the same words will not fit many another kind of a loaf, the U. S. government has at last taken action after consultation with prominent members of the baking industry.

The government's rules are not yet laid down in flat manner, with compulsory obedience required, but they are tentatively put forth for discussion.

## *The New Standards*

The recommendations of the joint Committee on Standards, U. S. Dept. of Agriculture follow in full:

Bread is the sound product made by baking a dough consisting of a leavened or unleavened mixture of ground grain and/or other clean, sound, edible farinaceous substance, with potable water, and with or without the addition of other edible substances. In the United States the name "bread," unqualified, is understood to mean wheat bread, white bread.

Wheat Bread Dough, White Bread Dough, is the dough consisting of a leavened and kneaded mixture of flour, potable water, edible fat or oil, sugar and/or other fermentable carbohydrate substance, salt and yeast, with or without the addition of milk or a milk product, of diastatic and/or proteolytic ferments, and of such limited amounts of unobjectionable salts as serve solely as yeast nutrients,\* and with or without the substitution of not more than three per cent (3%) of the flour ingredient by some other farinaceous substance.

Wheat Bread, White Bread, is the bread obtained by baking wheat bread dough in

the form of a loaf or of rolls or other units smaller than a loaf. It contains, one hour or more after baking, not more than thirty-eight per cent (38%) of moisture as determined upon the entire loaf.

Milk Bread is the bread obtained by baking a wheat bread dough in which not less than one-third ( $1/3$ ) of the water ingredient has been replaced by milk or its equivalent. It conforms to the moisture limitation for wheat bread.

Rye Bread is the bread obtained by baking a dough which differs from wheat bread dough in that not less than one-third ( $1/3$ ) of the flour ingredient has been replaced by rye flour. It conforms to the moisture limitation for wheat bread.

Raisin Bread is the bread obtained by baking wheat bread dough to which have been added sound raisins in quantity equivalent to at least three (3) ounces for each pound of the baked product and which may contain proportions of sweetening and shortening ingredients greater than those commonly used in wheat dough.

Brown Bread, Boston Brown Bread, is a bread made from rye and corn meals, with or without flour, whole-wheat flour, and/or rye flour with molasses, and in which chemical leavening agents, with or without sour milk, are commonly substituted for yeast.

In some localities the name brown bread is used to designate a bread obtained by baking a dough which differs from wheat bread dough in that a portion of the flour ingredient has been replaced by whole-wheat flour.

\*The propriety of the use of minute amounts of oxidizing agents as enzyme activators is assured for future consideration and without prejudice.

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association*

Vol. I

CHICAGO, ILLINOIS, SEPTEMBER 15th, 1922

No. 9

## Now for a Day of Growth

THE bakers of America came out in their strength at the September exposition. They demonstrated to machine makers that they valued the new inventions made ready for their use. For they bought—bought until the machinery men cheered for the sheer joy of selling.

And the bakers proved that they were capable of thinking in National terms, and terms of continuity of policy. For the first time in the history of their National organization they did not tear it all apart and send in green hands to set the pieces together again.

They strengthened their National

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leadership. Since the days when Jay Burns struggled to set down the names of even 100 bakers who would support a National organization, the Industry proved that it had traveled far, for there were over 500 members of the American Bakers Association on Chicago's Municipal Pier.

From strong state organizations which have grown up within the year the National's Board of Governors received

an enriching membership in the form of devoted leaders such as Ray Stritzinger of Pennsylvania, Alton Hathaway of Massachusetts, C. O. Swanson of Connecticut, and Paul Stern of Wisconsin.



# The New Way to Foregather

*Amendments to Our Constitution and Dues Slashed in Half Open the Road to all Hesitants*

**B**EFORE they come together again in a great National convention the members of the baking industry will foregather in local associations, in state associations, and in sectional associations of consolidated states.

Can the 500 members of the American Bakers Association who strengthened its organization and worked out new policies for it at Chicago's Municipal Pier come to the next National convention 5,000 strong instead of 500 strong?

A radically amended constitution and a heavy slashing of the dues were both undertaken because leaders of our industry know that its spokesmen must speak with authority, and with an industry solidly behind them if their voices are to carry across in Washington, before chambers of commerce, and before state and municipal authorities.

Hesitants and doubters who had given any reason for refusing to join had their reason taken into account.

At the cost of jeopardizing the National funds, without which the Association cannot do any more than keep a central office to collect the dues, as it used to, the dues were cut squarely in half.

The outgoing Board of Governors felt that no baker ought to have to plead that the dues were beyond his reach; that all ought to be free to join where there was the slightest impulse to join.

From \$52 per year the dues were cut to \$25 per year per oven, but this was not done directly. The amount of dues to be paid was brought under control of the Board of Governors, and the dues may be still further slashed as an enlarging mem-

bership makes it possible for more and more bakers to share in the raising of the National budget.

This budget for 1923 was placed at \$70,000 which is only one thirty-fifth of what one food industry, selling a substitute for bread, spends in advertising alone from its National headquarters.

Can any baker plead any more that the "dues are too high?"

## *All Vote as Equals*

Other bakers had begged to be excused on the grounds that the American Bakers Association was "a big man's show." They plead that it had no heart for the little man at all. Yet its leaders had opened laboratories here, free to all; had published bulletins of scientific discoveries and had made them free to all; had fought for better express rates and better tariff concessions that must benefit the smallest with the largest; they had introduced a School of Baking, open to all; and had sought to win a good name for bread in contracts with the schools, with public health officials, with great magazine and newspaper editors.

Well the "big bakers" did have one hold upon the association. Oven strength was a source of voting power as well as dues-paying power. Votes went with the size of the members' plants. Yet all that has been wiped out. Membership votes now on a man-to-man, or a plant-to-plant basis. Every member has as much to say as every other member. A constitutional amendment provided that voting should be on the American basis of man-to-man while dues were to be levied on the Amer-

ican taxation basis, in which each was to pay according to his strength as measured in ovens.

### *Codes are Declaratory*

Many bakers, especially small bakers, felt that the Sanitary Code and the Code of Ethics overshot a mark to which the majority of the industry's members could attain. They protested that they would bankrupt themselves making all the changes called for.

This one item, perhaps, has engendered more suspicion than any other connected with getting together.

It was held almost unanimously that their membership was vitally needed, and that the Code of Ethics and the Sanitary Code should be something for the Industry to hold up as basis for educational work, and not for fiat requirement.

So these features need hold no baker back any longer. The Association is proud, of course, of every advance, but as these codes now stand no hesitant baker can erect them into bugaboos and charge that through them the big bakers seek to combine to drive little bakers into bankruptcy.

Honorary membership was provided for in order suitably to honor those who have "rendered special or signal service" to the baking industry.

### *The Newly Elected Leaders*

To carry on the Association work, and guide its executive head, it was provided that the Board of Governors should meet "immediately previous to and immediately after the adjournment of each annual meeting."

It was provided that the President should call the Executive Committee together whenever he might see fit. To fill these responsible positions the following were elected:

#### ASSOCIATION OFFICERS

Wm. H. Korn, President,	Paul J. Stern, Second
H. Korn Baking Com-	Vice-President,
pany,	Atlas Bread Factory,
6th & Main Sts.,	31 Central Ave.,
Davenport, Iowa.	Milwaukee, Wisconsin.
J. M. Livingston,	Chas. A. Paesch,
First Vice-President,	Treasurer,
Livingston Baking Com-	Chas. Paesch & Son,
pany,	5224 W. Chicago Ave.
1301 Diversey Parkway, Chicago, Ill.	
Chicago, Illinois.	

#### EXECUTIVE COMMITTEE

William H. Korn, President.
J. M. Livingston, First Vice-President.
Paul J. Stern, Second Vice-President.
Chas. A. Paesch, Treasurer.
F. O. Stone, Chairman Sanitation Committee.
Lewis F. Bolser, Chairman Finance Committee.
A. L. Taggart, Chairman Publicity and Advertising Committee.
R. W. Stritzinger, Chairman Industrial Relations Committee.
J. M. Livingston, Chairman Institute Committee.
R. M. Allen, Chairman Public Relations and Express Rate Committee.

#### BOARD OF GOVERNORS

##### One Year Term

Chas. A. Paesch,	A. L. Taggart,
Chas. Paesch & Son,	Taggart Baking Com-
5224 W. Chicago Ave.,	pany,
Chicago, Illinois.	18 N. New Jersey St.,
	Indianapolis, Ind.
Ben S. Weil,	
Banner Grocers Baking	James P. Duffy,
Company,	Rochester, N. Y.
Oak & Stanton Ave.,	
Cincinnati, Ohio.	W. P. Matthaehi,
	Matthaehi, Bread Co.,
S. S. Watters,	701 S. Sprague St.,
Liberty Baking Com-	Tacoma, Washington.
pany,	
6018 Houston St.,	Gordon Smith,
Pittsburgh, Pa.	Smith's Bakery,
	904 Dauphin St.,
Chas. Schmidt,	Mobile, Ala.
City Baking Company,	
500 Equitable Bldg.,	Bryce B. Smith,
Baltimore, Md.	Consumers Bread Co.,
	600 E. 18th St.,
	Kansas City, Mo.



## Two Year Term

M. Lee Marshall, Campbell Baking Co., 31st & Troost Sts., Kansas City, Mo.	William Deininger, General Baking Co., 342 Madison Ave., New York City.
George S. Ward, Ward Baking Company, 367 Southern Blvd., New York City.	W. E. Long, 1118 Ashland Block, Chicago, Illinois.
Jay Burns, Jay Burns Baking Co., 20th & Cuming Sts., Omaha, Nebr.	C. O. Swanson, Massachusetts Baking Co., Bridgport, Conn.
William H. Korn, H. Korn Baking Co., 6th & Main Sts., Davenport, Iowa.	F. O. Stone, F. O. Stone Baking Co., 642 Richmond St., Cincinnati, Ohio.
Henry Stude, 708 Preston Ave., Houston, Texas.	

## Three Year Term

Lewis F. Bolser, Excelsior Baking Com- pany, Box 1626, Minneapolis, Minn.	Frank P. Hill, Hill-Ware Co., Inc., 3339 Park Ave., New York City.
Harry M. Freer, Akron Baking Company, 178 S. Forge St., Akron, Ohio.	R. K. Stritzinger, Lewis G. Stritzinger Co., Main & Markley Sts., Norristown, Pa.
Alton H. Hathaway, C. F. Hathaway & Sons, 25 Richdale Ave., Cambridge, Mass.	R. R. Beamish, Davis Standard Bread Co., Beaudry & Mignonette Sts., Los Angeles, Calif.
Richard Meyer, Consumers Baking Co., Ellison St., Paterson, N. J.	J. M. Livingston, Livingston Baking Co., 1301 Diversey Parkway, Chicago, Illinois.
Paul J. Stern, Atlas Bread Factory, 931 Central Ave., Milwaukee, Wisconsin.	

*The New Members*

Of the new members on this Board C. O. Swanson of Connecticut is an earnest believer in low dues and a large membership. He has staked his faith on the large reduction made in dues to build up a greatly enlarged association. Alton G. Hathaway is one of the most active members of the New England Bakers Association and was recommended as a Governor of the National by the unanimous vote of the New England Association at its meeting at Burlington, Vt. F. O. Stone is known to all Ohio bakers as a leader in their community; Paul J. Stern is a veteran association man who served with other leaders in starting the first bakers' institute over sixteen years ago. This was when George Haffner was dubbed "Doctor of Doughnuts" and "Professor of Pumpernickle" for suggesting bakery problems were worthy of the notice of men of science. Ray Stritzinger is one of the strongest builders in the Pennsylvania Association. Thus the National receives, to strengthen it, the men who have builded most energetically at home.

*An Allied Tradesman's View*

WHY should the majority of American leaders come from the lawyers, the doctors, the newspapermen? Because these have been the best educated classes. Now that we have a school of our own can't we bring out leaders for the National life? We shall develop educated bakers, and if we increase our capacity for service the reward will be inevitable. "Where there is no vision the people perish." It is true of a man as of a country. And also true of any industry. If we can show the vision behind the American Institute of Baking to each baker I know he will come in and put his shoulder to the wheel.

O. L. STEELE,

Member, Allied Trades of Baking Industry.

# The Growers' Pool in Wheat

*How it May Affect the Baking Industry as Seen by a Pool Promoter*

HOW far is the wheat pool of wheat growers in the Northwest likely to expand and what are its effects likely to be on the baking industry? In 1919 it controlled 1,000,000 bushels. In 1922 it claims to control 40,000,000.

The raisin pool of raisin growers wiped the control of all brokers and dealers out of the raisin market, as is well known, and more than quadrupled prices for raisins. At the same time it put only QUALITY raisins on the market and made them much more available to every form of buyer than they had ever been before.

The orange pool grew until it had absorbed all orange growers, except a negligible minority. And it took unto itself political power in Washington wherewith it drove out foreign competition by various devices of which the Tariff was only one.

The milk pool of the producers is just now looming into real size.

We believe the bakers of America should get straight information about the wheat pool of Northwest Wheat Growers Associated, just as they should get straight information about the new chain store development, and the new machinery developments that were so much in evidence at the Municipal Pier.

Therefore we asked Ray W. McClung of the wheat growers organization what it was doing, and how it looked from his "slant" as one of its promoters. Here is what he had to say in reply:

First as to the size of the pool of wheat growers, it began modestly in 1919-20 with control of a million bushels, mostly all of which was in the state of Washington. A cooperative association sold this wheat

all through the season, instead of letting go in the glut market of the first three months after harvest.

Next year the cooperative movement had absorbed 20,000,000 bushels; and this year it expanded its territory into Oregon, Idaho and Montana.

For 1922, the most responsible estimates place the bushelage to be marketed by cooperative organizations at near the 100 million mark. The North Dakota Wheat Growers' Association has been added to the northwestern group, where the movement originated; Nebraska, Colorado, Kansas, Oklahoma and Texas all have similar organizations operating for the first time.

## *The Baker's Interest*

Where does the baker come in? Is this new marketing plan, growing by hundreds of points each year, a forerunner of a combine designed to lift prices of wheat to an unbearable point?

Probably the best answer to these questions lies in an explanation of how these marketing groups are organized, and how they operate. The largest cooperatives sales establishment is the Northwest Wheat Growers Associated, which includes state associations in Washington, Oregon, Idaho, Montana, and North Dakota. This year it will sell approximately 40,000,000 bushels of wheat, according to estimates of its officers.

## *The Gigantic Grower's Pool*

In the past, because of habit and of financial pressure, 75 per cent of the year's wheat crop has been sold by the growers within three months after harvest. This



brand of salesmanship, flooding markets everywhere throughout the country without regard to consuming demand, has been mainly responsible for the vast fluctuations in wheat prices in the past. It is to smooth out the jagged price line of the year that the cooperative organizations are in existence.

They expect to accomplish more for their members; indeed, they already have accomplished more. Wheat is being conditioned, blended, prepared for market in its most attractive shape by these farmers' organizations themselves—work which formerly has been done by other hands, at a profit. Millions of bushels have been sold by farmers directly to mills, and directly to importers of other countries.

Does this mean higher prices for flour, the necessity for increased prices for bread? I think not. Any movement which will prevent a market glut in September will work to prevent a market shortage in May. If farmers are holding their wheat to fit the requirements of millers and of importing countries, they prevent that wheat getting in position for "corners" like that of May, 1922.

Again, through the influence of a pool of many millions of bushels there is eliminated the danger of sectional shortages of necessary milling varieties, in the past a frequent cause of trouble for mill and baker. Heretofore there has been little attempt on the part of the producer to fit his deliveries to market needs. There may be an acute shortages of good milling varieties in one locality and an oversupply in another, without any important attempt to change the flow to meet the situation.

### *Balancing Sectional Crops*

You have an example of how the cooperative associations can attack this problem, in the interests of producer,

millers, baker, consumer alike, in the present season. A short crop on the Pacific coast points to a coming scarcity of high-gluten wheats for western mills. To anticipate and prevent its occurrence Montana hard varieties today are being rolled to the west, instead of to Minneapolis markets as is generally the case. A west-coast shortage will be prevented—thus profit the miller and the baker. The hard wheat will find a ready sale there, and a glut in middle western markets will be avoided—thus profits the grower.

### *Question of Price*

So much for the operations of the organizations to date. What of the future? Is there substance in the statement that cooperative pooling associations, if organized to control a large part of the American crop, would work in combination to procure unreasonable prices for the grower members? A little thought should show the fallacy of any such opinion. The production of wheat cannot be limited to any particular group, or organized interest, as is the case with certain manufactured or mined commodities.

There are millions of acres of land which produce about equally well wheat or cotton, wheat or corn, wheat or tobacco, wheat or any number of other products. A movement which would shove wheat prices out of their just relative position with these other commodities one year would only result in the production of "unorganized" wheat on cotton, corn and tobacco lands the next season. It would be a short sighted group of producers who would risk any such development, even if the time come when the marketing associations are so expanded that they will be able to maintain a temporary governing position over wheat markets.

RAY W. McCLUNG.

# Harold Turley's Mold Garden

*How It Interested 700 Visitors at the American Institute of Baking*

NO BAKER, of the seven hundred who visited the new National home of the baking industry, during Bakers World's Fair Week in Chicago, ever can rest easy again while his flour, at home, is stored in a damp place.

One after another these seven hundred bakers looked into the fascinating world of Microscopia and found it more interesting, as seen beneath high-powered microscopes, than any world into which Gulliver strayed or Alice found in Wonderland, or Robinson Crusoe encountered on his Desert Island.

One by one these bakers glanced at a tiny particle of flour than could be seen with naked eye, and observed what storage in a damp place did for it. It was found all blotched over with black pimples each of which denoted colonies of mold.

Then they learned, by turning to twenty-two glasses in which Harold Turley, microscopist of the American Institute of Baking, grew his mold gardens, just how these molds ruined flour quality. For Turley had the molds at work, sending long feelers out to suck the life from the flour and turn it into a foul smelling and foul tasting concoction that would never make good bread. Yet to the naked eye the flour would look all right all the time.

To drive the lesson home so strongly that no baker could miss it Turley exhibited, in another microscope, a grain of flour stored in a dry place. There were no black blotches. It was sound flour.

All that was necessary to "bring alive" this world of Microscopia was to enlarge each particle of flour just 800 times.

All of the bakers present had seen molds as brown, black, red or blue blotches on

bread. But Turley showed them as hanging mold gardens, outbursts of blood-red foliage based on a bit of desirable food. In all he had segregated twenty-two varieties.

One variety he showed as a bed of snow, in appearance, which had a knack of rolling itself up into a series of snowballs, each one of which could blow away on any breeze and set up house-keeping wherever it might alight in favorable material.

The molds were shown from babyhood to old age. On those that grew spores the bakers were able to observe why it is that bakers find molds a plague when once they get started.

The "spores" were tiny black, yellow, red, brown, or blue balls, each one of which could barely be seen by the naked eye. Yet Turley explained that every one of those tiny balls, which grew by the millions on the space of a single slice of bread, contained from 500 to 1,000 mold spores. The spore pods opened up as seed pods of peas or beans and released these invisible little particles with every breath of air stirring in a bakery. Thus a few slices of bread, molding in a neglected corner of a bakery, would float out into the air, to settle on machines, rafters, window sills, and even on bread wrapping paper, millions upon millions of mold spores. Each one would grow wherever it could find warmth, moisture, and sugar. Thus a loaf of bread would become an ideal victim, provided it were sitting in a warm place with a bit of moisture in evidence.

Alton B. Hathaway of Cambridge, Mass., spoke for all bakers, probably, when he said that this exhibition of molds taught him more about the infection of



bakeries than he had ever been able to learn in years of bakery experience. And he also spoke for most of the seven hundred visitors, probably, when he told how it convinced him that an American Bakers Institute must be maintained by the Industry for the Industry, in order for it to forge ahead to its farthest possibilities of growth.

Mr. Hathaway came from a section whose bakers had remained "cold" to an idea of a National home for the industry. He went away as a member of the Board of Governors pledged to do all he could to build up this National Home and induce all bakers to participate in its support on a cash basis that would make the dues, per bakery, at the lowest possible rate.

There was something inspiring in the opportunity to see the stream of visitors pour past Mr. Turley's mold gardens. In the same room where Turley worked Max Henius, foremost American fermentologist for years, had bred up pure strains of brewers' yeast for many years.

These yeasts still stood inside a cabinet, each strain in its own chemist's test tube. There were some to give "lager" flavors and some to give "ale" flavors. Henius had carried on in America the scientific work in fermentology started by Louis Pasteur, greatest of French scientists and the original discoverer of yeast.

### *A Follower of Pasteur*

There was something dramatic in the fact that while the bakers of America were witnessing a laboratory demonstration of the world of Microscopia which Pasteur discovered, the French government was announcing the appropriation of 2,000,000 francs to properly celebrate the 100th anniversary of the birth of Pasteur.

Starting with the observed fact that dough soured while bread did not, he had learned how to keep wine from souring

by heating it or "pasteurizing" it; how to apply sterilization to beer; how to stop child-birth fever; how to cure rabies; how to cure typhoid, how to cure anthrax, and how to stop operations for gangrene.

It is true the medical world laughed at him so loudly that it was not until 1917 that they applied to gangrene the gospel of antiseptic washing that he proclaimed to deaf hearers in 1870.

But even so his discovery redounded to his fame even through its late application and helped on the move to proclaim him in 1922 the "symbol of French science."

Part of his work was to cry out in a fever of love for France that he would teach them, when the Siege of Paris should be lifted, to make better beer than the Germans ever could make. He had discovered that one of his microscopic families—the yeasts—could make flavor while acting upon the chemical constituents of the flour or malt they attacked.

He proposed to breed strains of yeasts to get the finest flavored beers, and he did it. And Max Henius carried on that task in America, so that the captive yeasts still stood in their flasks awaiting orders that cannot come, while Turley showed his visitors how, indeed, "Ceres had pushed Bacchus off his throne" in America.

Turley explained to his visitors how one of his tasks will be to take each of these yeast strains developed with so much care by the brewers, and try them out in flour—to determine if we can't build a loaf of bread with a better flavor than our present strains of yeast now give us. He explained how cheese flavors and wine flavors, won in such a great variety by this same process, point the way to possible success.

### *A Showing of Rope*

In microscopes magnifying tiny cells from 120 to 800 times Turley exhibited the malignant cells—single celled bacteria—that cause rope in bread. He showed them dividing themselves up and walling their spores with gelatin until they were similar in nature to asbestos-wrapped pipes. They were immune to outside heat, unless applied with great intensity. Thus it was, he explained, why rope bacteria could putrify bread after it had come through the ovens, while all mold was killed by the oven heat, except mold in spots where dented pans lessened the heat against the loaf because of non-conducting air pockets.

The mold exhibit, all explained in simple Anglo-Saxon English that any baker could understand, seemed so popular that it has been determined to make a traveling exhibit of it. Any bakers' association in a local or state meeting can obtain the presence of Mr. Turley with his exhibit by writing to the American Institute. It is to go to Boston as a first showing. The New England bakers will receive it as a demonstration of baking science on the word of Alton Hathaway. Others will accept it, when they see it, as a token of one of the fields in which bakers have something to do in common, besides quarrel and express sectional and class jealousies and fears towards one another. Altogether the exhibit was one of the most-to-be-remembered features of Bakers World's Fair Week.

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### *Millers at Our Home*

WE RECEIVE a great deal of valuable information from *Baking Technology* and read every issue from cover to cover," writes E. J. Hoagland of the Marshall Milling Co.

This magazine will never be worth its salt until it contains all that flour men should know about bakers and all that bakers should know about flour men, and until it is able to distribute both kinds of information to the farthest corner of the breadstuffs industry. It must have circulation to be of any use, and when it gets it no man will profit a cent, for the Industry owns this bulletin.

Is there a common cause to make? Flour men facing the problem of selling South America her flour, find that they must back their salesmanship up with BREAD FORMULAS suitable to that country. They have appealed to us, and not in vain, for such formulas. We found that Venezuela, for instance, imports low patents and hard wheat clears, and leavens from sour dough without yeast cakes. The problem was found to be further complicated through the use of hard water rich in lime content.

Bakes are being run in the American Institute with hard water and the flour as described above. Pretty soon Venezuelan bakers will be put in possession of the formulas best adapted to the complete success of American flours. Haphazard results here will be succeeded, as elsewhere, by exact results based on laboratory experiments.

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### *Bread's Rank as a Seller*

OF ALL commodities sold by the grocer bread ranks second in importance.

First come dairy products which take up 35 per cent of all money invested by grocers in stock. Bread takes up 16.3 per cent and canned goods, which rank third, take up 9.7 per cent.

—Condensed from a report of the New York State Department of Farms and Markets.



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entered in the post-office at Chicago, Illinois, as second-class matter, under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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SEPTEMBER 15, 1922

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### *We Work Together*

***To win through quality production  
and the utilization of scientific research  
a welcome for two loaves of bakers' bread  
for every one that now finds favor.***

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### *Our New President*

NOT by any indifferent pathway did William H. Korn become the twenty-sixth president of the American Bakers Association. For fifty centuries mankind has struggled for his daily bread and for the last fifty years of this period the Korn family has baked well for the people of Davenport, Iowa.

A unique family it has always been in that its members could always work together. Henry Korn, a stone-mason by trade, landed at Baltimore in 1859 as an immigrant boy. The Civil War made him a baker, just as the World War has contributed bright youngsters to the industry from its field bakeries.

At Davenport, where he settled after the war, he leased a bakery at Harrison Street and Pretzel alley, a favorable name in view of the fact that the Korn family was destined soon to make its hard rolls famous. Children arrived—"Bill," Charles, Harry, John, Otto—and each of

them grew up in the baking business, as did the two girls of the family.

Naturally they named their bread "Liberty" bread for that was what America meant to the family.

As "Bill" took hold he saw the first reaper-cut wheat come into the bakery; he saw the first machine purchased; he saw the first delivery wagon put on a former basket-walked route. He pinned his faith as leader of the second generation on new machines. No salesman with a good piece of machinery was ever turned from this baker's door.

He was a Rotarian, of course; all of the boys were, and in 1916 three held the office of president of their respective clubs. It goes without saying that a good Rotarian will be a good president for the American bakers. His should be an administration which sees strong, new growth in every branch of National endeavor.

It begins after a period of foundation work whose great builders will not be recognized and given the honor that is their due for many a year to come. For their work is yet covered with the dust of envies, suspicions, doubts, insinuations, and all those burdens real pioneers have borne since pioneering first began.

### *Former Presidents*

WHAT of the roster of Presidents, to which the name of William H. Korn is now added?

Who remembers the old stalwarts of the baking industry who began to pull it together as a mobilized whole? As we call the roll will anyone who remembers incidents in the lives of those now departed, please speak up, so that they can be added to the Industry's traditions which will one day shine brightly forth?

Charles Schneider, of Washington, first president 1898-99, and then following,

each serving a year's term, came Lewis J. Kolb, John E. McKinney, Robert Morton, F. R. Shepard, Wm. M. Regan, Martin Simon, B. Howard Smith, Adolph Boettler, H. B. Leary, Simon Hubig, William Meek, Paul Schulze, Geo. F. Clarke, F. H. Hohen-garten, Mark Bradin, Geo. M. Haffner, Jay Burns, S. F. McDonald, Henry Stude, Geo. S. Ward, Gordon Smith, C. N. Power, and Win M. Campbell and Alex Taggart.

During one war our Association was founded; during another it leaped into an importance that would have been impossible in an earlier time. Always a few far-seeing, devoted bakers carried the load—only a tithe of the Industry's real strength. Can't the rest see by now that it is time to make the American Association a real spokesman for a real industry with at least 10,000 members?

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### *Congratulations, Mr. Helms*

WHEN Paul Helms was called to the platform of the American Bakers Association convention to receive a gold medal as the baker of the best loaf of bread submitted in the B. E. M. A. prize contest, he brought with him Albert Fox, production manager of his plant.

Mr. Helms and Mr. Fox together bowed to the plaudits of their fellow bakers. In this way a remarkable production manager was publicly honored and his employer proved he was not a small man, bitten with jealousy towards a subordinate in his pay.

For the Hall Baking Co., of Buffalo, this pair of fellow workers won a prize that will make them distinguished for many a year. The whole industry moves towards quality production. For arriving at it in a signal way, these prize winners hold the finest banner aloft of which our industry can boast.

### *A Struggle and its Reward*

NOT by any accident did the judges pick out the Hall Baking Company's loaf for first prize. Now that it is all over a little secret of the judges' chambers may be allowed to leak. Each of the five judges looked over all of the 350 loaves in the competition. Each wrote down the numbers of the twelve loaves he wished to have entered for the final eliminations. The number of the Hall Baking Company's loaf was Number 1 on every single list. Thus was the decision made unanimous.

If any baker is losing heart over his sales, let him consider the Hall Baking Company's case. Seven years ago it owned one wagon and peddled bread from house to house. Now it owns 110 wagons and does a business of \$1,500,000 a year. Last June its president and its production Manager put their hearts upon winning the prize they have taken home. They studied flours. They studied yeast. They studied yeast foods. They studied formulas. They studied machines. Result? A loaf that stood forth upon the score card magnificently expanded in every element that counted in the score.

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### *Score Cards for All*

FOR those who do not believe the American Institute of Baking ought to function, there is a lesson in the production of a prize-winning loaf of bread. Last January the American Institute of Baking gave to the world a score card for an ideal loaf of bread. Discussion of what constitutes an ideal loaf was carried on in two numbers of Baking Technology.

The experts of the Institute who devised this score card figured ahead of their time,



of course, as all pioneers have to do. The "Ideal Loaf and How to Score It" was considered at the time of its publication a merely academic article, of no immediate value to the baker. Now the article is called for in scores of requests each week. Any baker wishing to score his bread by himself can obtain this article as a guide. He merely has to open his file of Baking Technology for January or write to us for a copy.

### *Louis Garttner Wins*

IN the smelting industry production managers in Peru, Utah, Nevada, Arizona, all compete for the finest showing on their balance sheet, and the famous smelter managers work their way from one important job to another according to the record they leave behind in each.

A few years ago Louis Garttner was an employee of Clif Powers out in Colorado. He moved on eastward, gaining a little skill in each new job he tackled. He studied efficiency in the W. E. Long Co., and finally decided that nothing else than working out his own ideas in a big baking plant would make him happy.

He gained his chance at Fort Wayne, and has just won an "Efficiency Cup" from the Long organization for keeping 20 different controllable factors of cost in the best shape of any plant manager in the organization. He won the cup six consecutive times, thus making it impossible by mid-year for any rival to outdistance him in monthly reports.

The plant Garttner operates has existed for less than two years. It already has a commanding position in the town, and is owned by a lawyer who knows enough about the baking business to trust his production man. Of men like Garttner many are now headed for conspicuous successes in bakery plants. The call for them on

this Headquarters becomes louder and more insistent each month.

The only trouble with our ability to furnish men as demanded is that practically all students in our School of Baking are asked for before they even enter the school.

Of students free to accept offers practically none have yet applied. Of course no young graduate could qualify for such work as production manager. Years of experience under skilled superiors underlies Mr. Garttner's victory. But the youngster starting with a thorough knowledge of the chemistry of the dough room will travel farther than any of his competitors.

### *A Chicago Baker*

TAKE it from general appearances and Jules Livingston is a Chicago baker who never has a minute for his bakery. If bakers in a distant city get to eating each other's heads off he is never too busy to go to the telephone and spend hundreds of dollars in long distance calls to unruffle their aroused animosities.

If Chicago city officials need a representative for any public service Jules is never too busy to respond. If we drop in to park on him while we add up some grievous problem he has time to listen.

Yet—here is the strange part—you never hear the least creaking of his bakery machinery. It runs along as if propelled by magic, and his bread you find easy to buy wherever bread is sold.

It is the same with the Schepps boys in Dallas, Texas, who have taken over the presidency and secretaryship of the Texas association; with the chief workers in the Tennessee association; with the liveliest of bakeries in each community into which we chance to wander. The time seems past when success will remain with any baker who remains indoors in his shop.

### *Thanks to the A. P.*

IT IS often said that our great news agencies get the news crooked, sensationalize it, and badly serve interests entering into the news field.

In the case of the American Bakers Association, its members foregathered in Chicago September 11th for the greatest meeting of bakers ever held. It had social significance for it was celebrating the coming of the machine era into the baking industry, and the beginning of a baking era "with mother's backache left out."

In newspapers all over America the Associated Press carried the story of this convention in words truly setting forth its character. Its responsible officers in Chicago applied at the National home of the baking industry for a statement, ten days before the convention occurred. And having obtained a responsible view it put it out in this direct drive at the home-baking housewife:

"Scientists will attempt to demonstrate that mother's methods in baking bread are out of date when the bakery exposition and conventions of national baker associations are held September 11 to 16.

"How modern scientific control has taken all chance and possibility of mishap out of what was once mother's intuition in getting a good bake of bread will be shown. Huge steel-armed mixers, each having the strength and working power of 200,000 women, traveling ovens and other modern machinery will demonstrate the exactitude of the modern bake shop."

The Associated Press story gave editors something to think of all over America, too. It will be a little harder for them, now, to start their foolish drives to scare women "back to the kitchen drudgery."

Scores of writers for magazines and newspapers thronged the Municipal Pier

along with the baker visitors. They learned much, and none of it was unfavorable to the great industry there represented.

### *From Woods Hutchinson*

FROM all three parties who were engaged some time back in a "heavy boost for meat" at the expense of bread, have come some denials, promises, and suggestions as to the future.

1. Collier's Weekly has thrown its columns open to the American Bakers Association to make a full statement as to the importance of bread and the American baking industry in modern American life. Our statement we hope to have published shortly.

2. W. W. Woods, manager of the Bureau of Public Relations, of the Institute of American Meat Packers, has written us a full denial that the packers had anything to do with Woods Hutchinson or his article.

3. Dr. Woods Hutchinson has written to H. E. Barnard, the following good-natured note explaining he was not so much a foe of bread as might have appeared:

I was very glad to get your "scolding" though sorry my sacriligious remarks about your favorite food have distressed you. I have the highest regard for bread but think our American and English dietaries have been a trifle over breaded.

I have no fear but that there will still be plenty of bread eaten in spite of my pointing out a few spots in the sun of its fame. Thanks very much for your invitation to visit the American Institute of Baking which I shall certainly accept the next time I am in Chicago.

Yours very truly,  
WOODS HUTCHINSON.



# The Baker in the Courts

*He has Won Important Decisions Protecting Him From Label Infringements While More Similar Suits Await Trial*

OUT IN DENVER Clif Powers has made the name of "Pueblo Maid" bread as famous as anything else in the Far West. Recently he decided to add macaroni to his bakery products but unfortunately the news of his plan got out in the newspapers ahead of his production date. The result was an immediate appearance of "Pueblo Maid" macaroni with another manufacturer as the maker.

Result? A law suit which is still pending in which Mr. Powers has to prove that macaroni is a product in the same general class with bread, and properly the product of a bread baking institution. He has to guide him a suit in which a piano company prevented a rival from putting out a talking machine bearing a name made famous by the piano company. The courts then held that the copyrighted name covered all musical instruments whether or not the firm manufactured them.

## *A Bond Bread Victory*

In another law suit, this time in New Jersey, the General Baking Company came off victor in the matter of infringement on a copyrighted bread wrapper. As all bakers using bread wrappers or favorite trade names may encounter the problem fought out in this case the details of the argument and the court's decision are here given in full.

The suit was by the General Baking Co., against A. Koment of Jersey City and was heard in the New Jersey Court of Chancery by Vice Chancellor John Griffin. The General Baking Co. was represented by the law firm of Rabenold and Scribner, general counsel of the American Bakers Association.

The suit grew out of the adoption by Koment in 1920 of a specially designed wrapper for his principal loaf called "Migh Bread". His plant is a few blocks away from the General Baking Company's Jersey City plant and on the routes where the two concerns came into competition the General Baking Company began to receive complaints from its salesmen that the retail grocers were mixing the Koment loaves on their counters with the Bond Bread loaves, thereby causing confusion and mistake among the retail buyers. After an investigation which developed instances of buyers who actually got the Koment loaf when they thought they were getting the Bond loaf, a protest was made to Koment who insisted that he was within his rights.

The General Baking Company then filed its bill of complaint in which it set forth its claim for protection of its Bond Bread wrapper showing the emphasis in its advertising and other publicity work upon the "Bond" idea.

The complaint stated:

"The controlling idea and principle in all of the publicity work of the complainant for Bond Bread has been to attract the attention of consumers of bread to Bond Bread by wrappers and other publicity matter, developing graphically the theme of the word "Bond;" and to the extent that such consumers become purchasers of Bond Bread, to impress upon them by the same methods for future purchases and for regular patronage the distinctive name and wrapper of Bond Bread.

"In carrying out such controlling idea and principle the complainant has at all times marketed its Bond Bread in a distinctive wrapper, the most striking features of which and (a) bright green rectangles, with (b)

scalloped edges, and with (c) fine scroll work in green and white lines close together, surrounding the name Bond Bread; and (d) a continuous alternation on the wrapper of a long and short pattern. A sample of the wrapper so used is annexed hereto and marked Schedule A. All these distinctive features grow out of the central idea that the obligation of the complainant, warranting the materials in the loaf, is in the nature of a bond and said features are those commonly associated with the appearance of a bond and coupons, and therefore carry out the purpose of fixing in the minds and memories of consumers of bread the appearance of the wrapped loaf of bread which they have come to know in the market as Bond Bread.

"In furtherance of the same controlling idea and principle, the complainant has for a long period of time impressed upon the public these external methods of identifying Bond Bread by repeating features (a), (b) and (c) above mentioned, on its checks, its letter paper, its envelopes, passing through many hands through the mails, its delivery wagons, passing continually through the public streets, its sign board advertising, its magazine advertising and (except for the color) its newspaper advertising.

"In consequence of the emphasis so placed by the complainant on the features (a), (b), (c) and (d) above mentioned and in consequence of the peculiar effectiveness of such features in arresting attention and making a lasting impression on the memory, and in consequence of the suggestion of Bond Bread which those features convey when combined on a wrapper in a loaf of bread, those of the public desiring to purchase Bond Bread at retail stores become habituated to picking it out from other loaves by the above distinctive features in its wrapper or by the general appearance resulting from a combination of these features; and in many instances, as in the case of children who frequently are the ones sent to buy the bread for the family, the selection is made in this way exclusively."

At the trial a particularly interesting feature developed through the calling of a great many children as witnesses. It was the claim of the General Baking Com-

pany that the infringement was made but if the infringing wrapper was so similar as to deceive the class of people who go to the stores and buy a loaf of bread and that in defining that class account must be taken of the general practice of sending children on such errands.

### *Children as Witnesses*

The children called as witnesses testified to being sent for Bond Bread and getting the defendant's loaf by mistake. Their testimony was supported by that of adult customers and also by that of grocers, one of whom testified that he had to put some other kind of bread between the Bond Bread and the Migh Bread "to keep the two greens from fighting each other."

The Vice Chancellor after receiving briefs from the attorneys and deliberating on the case, announced his decision in favor of the General Baking Company. In a memorandum explaining his decision he calls attention to the fact that the defendants' adoption of the infringing wrapper came at the end of a period where the defendants' sales of bread "showed little or no increase" and at a time when the defendant had employed one Jarnagin to improve the quality of the bread and increase the sales.

### *The Judge's View*

After carefully analyzing and comparing the two wrappers the Vice Chancellor applied the law as follows:

"Laying the wrappers side by side, one would hardly say that any person, even those of the mentality who are accustomed to buying bread would be deceived.

"But when the loaves are laid side by side by the grocers or mingled with breads of other bakers, a different situation is presented, there the customer who usually picks his loaf from the pile is confronted with the ends of the loaf showing green with scalloped edges and might easily, using the care which might be treated as ordinary in the



persons buying, and the value of the article, pick a loaf of Migh Bread for Bond Bread, and this has happened in a number of instances.

"It is therefore well to inquire what amount of ignorance or want of care will take from the purchaser the law's protection and permit rival concerns to so dress up their goods that the one may deceive such purchasers to the detriment of the other. \* \* \*

"Applying the rule laid down by Vice-Cancellor Van Fleet as to the care ordinarily exercised by buyers, we are confronted with the fact the article is cheap and a very large portion of the persons buying are children and uneducated persons and persons of foreign birth who do not read or speak our language.

"From these conditions it is easy to infer that they will be more readily deceived, than in cases where the article costs more, and the purchasers are drawn from a class of higher intelligence. \* \* \*

"There are other circumstances that lead to the conclusion that Mr. Jarnagin intended to go as close to complainant's wrapper as possible without infringing.

"He first designed the insert C 27, which Mr. Koment discontinued because the black and green resembled somewhat the Bond wrapper; he next designed the wrapper in suit and in answer to the question of an employee, Are you imitating the Bond wrapper, he said, No, there is a difference. This is the substance of the conversation. There were also conversations during the period of designing the wrapper in which Jarnagin and Koment discussed matters, which showed that they had in mind the Bond wrapper and so far as I have been able to see Mr. Koment desired to avoid infringement but Jarnagin who was receiving a salary and as I recall 2% on the increased sales was not so particular. He was an expert in the bakery business and was expected to use his experience to increase the sales; this he did so well that within about a month after the defendant's bread was put on the market the sales doubled. This coupled with the proof in the case of purchasers having been deceived is rather persuasive evidence of the deceit.

"A decree will be advised restraining defendant from using the wrapper, but as it has been in use for a long time, and as I find

that Mr. Koment did not intend to commit actual fraud, counsel may consider whether a short period should not be allowed the defendant to procure other wrappers if it is now without them."

### *Defendant Restrained*

On this decision a decree was entered in favor of General Baking Company enjoining the further use after September 11, 1922 of the particular wrapper which the defendant has been using and of any "wrapper so combining any of the features of complainant's Bond Bread wrapper of a green rectangle with scalloped edges, with fine lines of scroll work, network or grill work and alternating short and long rectangles so as to make the loaf of bread so wrapped, similar in appearance to the wrapped loaf of Bond Bread marketed by the complainant."

The decree further reserves the question of the accountability of Koment to General Baking Company for his profits realized from the sale of the bread in the infringing wrapper which profits the General Baking Company alleged in its complaint to amount to upwards of \$20,000. The decree finally, by way of further protection to the complainant, provides that, in case the defendant should seek to infringe the wrapper in any new way, relief against this will be granted without the necessity of a second suit; the case being held open for that purpose.

Many bakers have found that the law itself needs amending for their further protection in these days of expanding business. Some bakers have made trade names famous in one section of the country only to have them infringed liberally in other sections. "Beechnut" for instance now is applied to everything from bread to chewing gum, including cigarettes, bacon and preserves.

### *By a Zealous New Zealander*

WILL somebody please page Woods Hutchinson, the doctor who writes meaty articles about the unwholesomeness of bread? Over in New Zealand a zealous poet has burst into rhyme about bread and he finds it very fine, even down among the poorest classes, where he has observed that the children of the very poor are the very healthiest.

Here is his earnest little rhyme:

'Tis only those who care not  
Who choose expensive food,  
But not the comely matron  
Surrounded by her brood.

She knows the value of the loaf,  
Her children's health reflects it,  
While those who live on high priced food,  
Their health, it seems neglected.

Go through the poorer districts  
And note the children there.  
They're dirty, yes, but healthy;  
They live on bread and air.

Then take the high-class neighborhoods,  
The children pale and weak,  
Those are the kids whose parents  
For them high-class victuals seek.

Bread is all that the poet of New Zealand says of it, and before long the baking industry will find the way to make two loaves of it welcome for every one that is now received in confidence into an American home.

### *Again the Return of Stales*

BAKERS of New York City, in a conference at the Hotel McAlpin, agreed upon the following resolution as their stand upon the question of the return of stale bread:

We bakers of the City and State of New York, assembled in conference at the Hotel McAlpin this 30th day of

August, 1922, declare ourselves wholeheartedly and unreservedly in favor of State legislation with a view to eradicating the evil of taking back unsold bread, and pledge our moral and financial support to any endeavors of the New York State wholesale bakers' association to bring about the early passage of such regulation as will do away with this evil."

The resolution was subscribed to by the baking firms of Adler & Eckstein, Ward Baking Co., Shults Bread Co., Cushman Sons Inc., General Baking Co., Howard Baking Corp., Pechter Baking Co., Geo. Happ, Jr., Rockwell Bakery, Gottfried Baking Co., and the Messing Bread Co.

As a result of this conference the forthcoming session of the New York State legislature will receive a measure intended to correct the return-of-stales evil.

### *A Baking School Student*

WE WOULD like your counsel," writes the Perfection Biscuit Company, "in regard to sending one of our employees to your school. Last March we took into our employment a man who had just come from Germany where he had served his apprenticeship as a waiter. He did not care to follow that trade here but is desirous of learning the baking business. He is intelligent and we believe he will make the most of an opportunity. Do you think he had better work awhile to get mechanical experience or would it be better for him to start school at once?"

The answer is simple. One student who really wants to learn is worth a dozen who come only because they are sent. A man such as that described is one the industry needs and whose schooling cannot begin too quickly.



# The Baker's Wheat and Flour

*They Never Come Twice to Mill or Bakery in Same Quality and  
Thus Give Laboratories a Problem*

How many bakers realize that with our present knowledge and experience we can do but little towards controlling the milling and baking value of our wheat? Some of the problems of the wheat field have stubbornly resisted solution. Others our cereal chemists are just beginning to understand.

The baker knows he cannot bake into his bread fundamental qualities that are lacking in the flour and the miller knows he cannot grind into his flour certain fundamental qualities that are lacking in his wheat. For this reason both baker and miller must know, in common with the wheat farmer, about crop rotation, seed selection, preparation of the fields, and the effect of climate and soil quality on the wheat crop, the flour, and finally upon the baker's loaf. For the loaf as it finally comes from the oven is a reflection of all of these.

Often because of climatic conditions that no man can control

The farmer is compelled to bring to the miller and the miller is compelled to utilize much wheat lacking more or less in desirable milling and baking qualities. Not all of the steer which the farmer grows is porterhouse and tenderloin; neither is all the wheat "shoe peg" Turkey or Dark Northern. Just as we must learn to utilize the poorer cuts of meat, or pay big premiums for the fancy cuts, so must we learn how to get the best possible results from some wheat and flour that is not first class, or the premiums demanded for the so-called fancy patents will become prohibitive.

The country miller uses what he can of this "off quality" wheat by blending it

with other stronger wheat that will largely offset the deficiencies. The remainder is shipped on to the terminal market in order that a brother miller may labor with it. Here the terminal miller blends it with many other types, hoping to counteract poor quality by offsetting with good.

Most of the millers buy wheat on its origin and its physical appearance, although they check their judgment by chemical and milling and baking tests. Some of the bakers formerly bought a certain brand of flour because the flour salesman told them the mill producing it was located in the heart of the best wheat section, had the best head miller, and the flour was the whitest. Most of these have quit, and the progressive baker today buys a certain brand of flour because he has tried it and knows what it will do. The better mills have learned the value of supplying their customers with a high quality, uniform flour.

Attempts have been made to fix standards or specifications for wheat and for flour. We have become accustomed to standards for wheat grades and they are of benefit to the trade, but our Federal wheat grades of today do not at all accurately reflect the milling and baking values of wheat. Neither does it seem possible to write out a set of specifications for flour which are practicable of application and which will insure delivery of a uniformly satisfactory product.

## *Grades Useless to Baker*

We may specify maximum limits of moisture, ash and acidity, together with minimum limits of protein and absorption, and the flour delivered may meet all

these specifications without POSSESSING THE ABILITY TO MAKE A SATISFACTORY LOAF OF BREAD.

Data obtained by the various experiment stations have shown that wheat from a given lot of seed may be sown not only in different states but in different localities within the same state, and under seed bed conditions practically identical, and yet the resulting crop in these different fields may vary decidedly in composition.

Protein is the substance usually showing greatest variation. Seed of different varieties has been subdivided into small lots and sent into different counties where each variety is sown under comparable conditions for any one variety and farm. Analyses of samples from the resulting crop involving one variety, one season and one state only have shown a variation of from 8.8% to 18% in protein. Similar varieties have shown approximately equal variations, yet the averages of a large number of samples show that differences between similar varieties are within experimental error.

### *Picking Up Proteins*

At the same time, it has been shown that the protein content of the seed wheat has practically no effect upon the resulting crop. In other words, the seed wheat may contain only 8.8% yet the resulting crop may show 22% protein. And the reverse of this condition may just as easily occur. It should be explained, however, that this extremely wide range in protein content does not usually take place in a single locality but is found in different localities exhibiting rather wide differences in climatic conditions.

The temperature and moisture conditions prevailing during the latter part of the fruiting period, that is just before harvest, usually have the greatest influence upon protein content. Hot winds

with limited variable moisture a week or ten days before harvest arrest the development of the grain and cause some shriveling of the kernels. Since the protein is stored early in the kernel formation and the starch later, the arresting of the later stages of development means less storage of starch and consequently a higher percentage of protein. Nebraska this year apparently has a stronger crop than usual due to just such conditions.

So much for variations in chemical composition.

### *Gluten's Variations*

On the other hand, some of the samples may show practically the same general chemical analysis and yet the flours milled from these wheats differ widely in their ability to produce good bread. Why? The answer usually given is—difference in character or quality of gluten. The problems still unsolved are—what constitutes this difference in character or quality of gluten? What sort of chemical determination will tell most about it? Can this difference really be determined without subjecting the wheat to a milling test and the flour to a baking test? How may all this be written into the specifications, and is it practicable after it has been worked out?

We may also specify certain maximum percentages of patent or straight, but such percentages mean practically nothing unless we know something of the character of wheat used, and the amount required to produce a barrel of flour. In other words, is the miller grinding wheat testing 57, 59 or 61 pounds, and is he getting a 4-25 or 4-40 yield? If the flour shows a high ash content, is it high because of long percentage and low yield, or has the tempering and purification been faulty?



Even then, if the wheat used in making up this mill blend is not of the right type, and has not been produced under the proper climatic or soil conditions, the gluten of the flour will not possess the proper characteristics and hence will not, under our usual methods of handling, produce a light, well-piled loaf of good flavor, texture and color, and one that does not dry out too readily.

### *Problems to be Solved*

It would seem that some of the important problems before us for solution are, first, the production of wheat of highest milling and baking value, insofar as this is possible; second, discovery of the best methods of blending and milling this wheat into flour; third, the developing of the best methods of utilizing flour, good, medium and poor, in order to produce the most nutritious and at the same time attractive loaf of bread.

It is my personal belief that the solution of these problems can best be brought about by the united application of the very best scientific training, together with the best practical experience. Research as ordinarily carried on at our universities is a thing quite different from the research carried on in connection with an industrial institution. The one is pure science and concerned primarily with the discovery of laws and principles, while the other is applied science and goes further in that it not only discovers laws and principles but also discovers ways and means of applying these laws and principles for the betterment of the industry. No industry can live and thrive on principles alone. Practical utilization is the thing that spells success, and the baking chemist must never overlook this important fact.

DR. L. A. FITZ,

Cereal Chemist, The Fleischmann Laboratories

### *Bakers Who are Coming Along*

The baking industry, of course, is better for every baker who loves it so well that he wishes his sons to follow along in their father's footsteps.

"I should like very much to be in a position to send one of my boys along to participate in the honor of being in your first class in the School of Baking," writes G. S. McKenzie of Honolulu, Hawaii, U. S. A., "but both of my boys are still very small and you will not get them on your student roll for some years yet. However you can rest assured that I am hoping that one of them at least will fall into this line of trade, and avail himself of the wonderful opportunity to become a top-notch baker. And this through instruction and practical knowledge given by the Institute conducted by our American Bakers Association."

For these little Hawaiians, of course, the door of the School of Baking will ever swing open.

There are also some others. Gordon Smith of Mobile has promised a son for Baking School as soon as he grows a bit.

One of the first pioneer students to arrive was Carl Ritter, son of Nicholas Ritter, a baker of New Albany, Indiana.

Will Payne of Cincinnati was represented by his brother, Harold Payne.

In this way the Baking School is coming to occupy a position as an experiment station at which the Industry's Future will be molded, in part, from the Present, with the younger generations of our leaders of to-day to "carry on."

I am writing to tell you of our appreciation of Baking Technology. It is very interesting, and we are looking forward to reading the Journal, with a great deal of pleasure and profit."

W. F. HAND, PH. D., State Chemist,  
Mississippi Agricultural & Mechanical College.

### *A Million Dollar Bread Ad*

DO THE BAKERS of America feel like cooperating with the California raisin growers to the extent of putting fat rations of raisins into raisin bread in return for a million dollar advertising campaign devoted to the selling of bakers' raisin bread to American housewives? The advertising, if undertaken, is to go into magazines, newspapers, and on billboards.

Dr. H. E. Barnard, director of the American Institute of Baking, has received the following telegram from the raisin capital of America, Fresno, Cal.

"Sunmaid Raisin growers have appropriated two million and a half dollars for advertising purposes during the next year. This is the largest advertising campaign ever devoted to a single food product. We can devote 50 per cent of it to bakery products, bread and pie, if bakers are willing to cooperate by making raisin bread and pie available after we direct public to their local bakers for them. We shall use 75 magazines, 5,000 newspapers and complete poster campaign.

"We have greatly reduced our prices this year. May we count on the cooperation of the National officers of the American Bakers Association? Will you seek to secure and maintain the hearty cooperation of your members?"

S. Q. GRADY,  
Director Sales and Advertising,  
Sunmaid Raisin Growers.

The question is one for very baker to think of and to write us about. Dr. Barnard has assured the growers cooperation to the fullest extent American bakers are individually willing to participate in it.

### *A Bad Bakery Practice*

MORE deeply, perhaps, than most bakers realize do words like these printed below sink into the hearts of women who buy bread. To make it impossible ever to have to write such words is, of course, an aim to which all bakers will subscribe. It is the thing which has drawn hundreds of bakers together as a nucleus of a

really strong National organization.

"I call your attention to the need for the strictest enforcement of the law against 'rolling bread,'" writes R. M. Black, chief of the division of Dairy and Food Inspection of the State of Ohio. "This is the practice of drivers of delivery trucks under which they take up bread from one grocery, mix it up with fresh bread, and again distribute it to customers. Thus they may take up loaves from some filthy grocery and distribute them to a sanitary grocery whose customers depend on the store's reputation for cleanliness. You know only about 50 per cent of bakery products are wrapped. What an opportunity to disseminate tuberculosis, diphtheria, and most other infectious diseases. I ask your best efforts to aid in breaking up this practice."

Our Sanitary Code is now "declaratory" and a basis for educational campaigns. We can never hope to win the confidence of American women while this kind of primary education still has to be indulged in.

### *Waxed Paper Troubles*

PROBLEMS of the baking industry will never be solved until wheat, flour, supplies, machinery and even waxed paper problems are all solved, too. The American Bakers Association is now invited to form a committee on waxed paper copyrights. It seems the Waxed Paper Manufacturers' Association threw its copyrights open to all, and then some private parties rushed to have them registered as their own with very slight changes. O. B. Towne, Secretary of the Waxed Paper Manufacturers' Association, invites us to joint action and the American Bakers Association surely will take it to protect and guarantee equal rights to all bread wrappers users.



# Bread Weights and Tolerances

*Report of a Conference Between U. S. Government Officials and  
Representatives of the Baking Industry*

THERE meets in Washington every year an organization known as the Annual Conference on Weights and Measures.

It consists of state and Federal officials having to do with "weights and measures" legislation and the enforcement of weights and measures laws. This year it is working up a standard bread weight law, to recommend to all states, based on what these officials think the baking industry should reasonably be expected to adhere to.

The government committee consists of John M. Mote, John F. Cummings and F. S. Holbrook. Instead of proceeding by itself it appointed a conference committee to meet with members of the baking industry.

The first joint-meeting of the two committees occurred in Detroit in August, with R. M. Allen, of New York, Dr. H. E. Barnard, business manager of the American Bakers Association, and Jay Burns of Omaha, representing the American Bakers Association. Ellwood M. Rabenold was present as counsel, and C. J. Kremer of Milwaukee represented the National Retail Bakers Association.

The joint committee failed as a cooperative conference, according to a report sent out by the government representatives to members of the Conference on Weights and Measures. It failed, they said, because the representatives of the baking industry could not agree to accept the standard weight principles in the proposed law printed herewith.

How the government representatives viewed this conference and its results is a matter of such importance to the bak-

ing industry that their report to their own associates is printed here practically in full. As signed by Messrs. Mote, Cummings and Holbrook their report sets forth:

## *Report of Committee*

The joint committees organized by the election of Mr. John M. Mote as Chairman of the meeting and Dr. H. E. Barnard as secretary.

The first definite proposal was made by the bakers' committee and was briefly to the effect that bread should be sold on a basis of the moisture-free content of the loaf with the understanding that the moisture content should not be in excess of 38 per cent, this being the value fixed by the tentative bread quality standards recently issued for discussion by the joint committee on standards, U. S. Department of Agriculture.

The bakers' representatives urged that this was the most fair and equitable way to sell bread being based upon the food content of the loaf which is the most important factor; further that this method would eliminate the importance of shrinkage, since the moisture free content would remain the same at all times.

Your committee replied that in their opinion the proposal was impracticable since it would be a sale upon such a basis that the weight could not be checked by the purchaser and it would introduce new and complicating factors into the enforcement of weights and measures laws since practically no violation could be proven without a chemical analysis of the loaf. Other commodities are not so sold although there are many manufactured

products in which water is present in the finished product, flour and butter, for example, and many natural products sold by weight contain very large percentages of moisture.

### *Bakers' Plans Rejected*

After discussion your committee took the ground that such a method of sale would be unsatisfactory to weights and measures officials.

Much discussion followed on the general question of standard weight loaves and tolerances for bread. Finally Mr. Rabenold read and placed before the meeting for consideration a bill modeled upon the present law in Massachusetts. Among others things this provided that bread should be sold either in standard weight loaves or in loaves of any other sizes provided these were either properly labeled with their weight or, in the case of sale at retail upon the premises where produced, there was a representation by means of a sign posted adjacent to the bread showing the weights of the various sizes and kinds of bread sold in the bakery.

Your committee at once took the position that it did not consider itself at liberty to negotiate any legislation which did not require standard weights in every case since it considered itself BOUND BY THE ACTION OF THE FOURTEENTH ANNUAL CONFERENCE on this matter. The representatives of the baking industry on their part did not feel free to commit the industry in any way to the standard weight principle. After much discussion on these viewpoints it became apparent that no agreement on legislation was possible. Thus the first purpose of the joint meeting of committees definitely failed.

Your committee then urged that the question of tolerances be given consider-

ation and that some constructive action be taken. Some of the bakers' representatives were in favor of such a discussion, but Mr. Rabenold was opposed to this procedure since he urged that the bakers would then be assisting in the formulation and perfecting of proposed legislation which would be introduced in the form of a standard weight bill. Your committee agreed that the tolerances would be so used in some cases, but pointed out that reasonable tolerances when arrived at would be equally applicable to bread whether in standard loaves or not.

The joint meeting then recessed to allow a decision of the bakers' committee on the procedure to be followed in respect to tolerances. The bakers' representatives were requested by your committee to bring in recommendations on three points, namely, (1) size of tolerances, (2) number of loaves necessary to obtain a fair average weight, and (3) time after baking within which bread should be weighed. On the last point your committee reserved the right to discuss whether or not a time limit in hours should be set on account of difficulty of proof as to the time when any bread had been removed from the oven.

Upon the reassembling of the meeting the bakers' representatives submitted to your committee a bill which was said to be satisfactory to the baking industry and asked for it the careful future consideration of your committee.

Upon the question of tolerances they stated that tolerances were provided for in the bill submitted and that they would stand on the recommendation therein made.

There being no further business to come before the meeting, adjournment was taken subject to the call of the Chairman.



### *What Bakers Favor*

The basis of the bill finally submitted by the bakers' committee is the Massachusetts Bread Law with several amendments:

Section 1 provides for the sale of bread in standard weight loaves, said weights to be determined not more than 12 hours after baking or delivery to retailer on the average weight of 6 loaves or 12 loaves, if available.

Section 2 exempts rolls and fancy bread weighing less than 4 ounces and also exempts from the standard weight requirement all bread the weight of which is represented upon the wrapper, or in the case of unwrapped bread, by a label or a pan impression, upon the loaf, or in the case of any bread sold at retail upon the premises of the manufacturer by a notice posted in close proximity to the bread, setting forth the weight of each size and variety of loaf sold.

Section 3 provides for rules and regulations to be made by the State official and to include tolerances, the seizure of bread deemed to be in violation of law, and for an appeal by the baker to the State weights and measures official before prosecution. It is provided that the tolerance shall not be less than one ounce per pound under the standard unit or represented weight.

Section 4 provides a penalty of not more than \$100.00.

### *Plan Is Opposed*

Naturally your committee cannot agree with the principle embodied in this bill. Not only may bread be sold in other than standard weight loaves but the tolerance is believed to be excessive. The tolerances rejected by the Fifteenth Annual Conference on the ground that they were too large are very much smaller than those proposed here. Briefly, the tolerances re-

commended at the conference provided that on the average weight no tolerances in deficiency be allowed up to time of delivery to retailer and  $\frac{1}{2}$  ounce per pound in deficiency thereafter and up to the time the bread was declared to be stale and sold as such. The tolerance in this bill is a minimum of 1 ounce per pound in deficiency on the average weight at any time after removal from the oven and up to 12 hours after delivery to retailer. Following this time when in the hands of the retailer this tolerance may be exceeded whether bread is being sold as fresh bread or not.

### *Bread Law Recommendations*

The necessity of having a model bread law ready for introduction during the coming sessions of the legislatures of the various States was pointed out at the last conference. It was hoped that some legislation satisfactory to the weights and measures officials and the baking industry might be framed at the joint meeting reported above. In the failure of this your committee recommends the introduction in the various jurisdictions not already having a satisfactory law, of the Model Bread Law adopted by the Fourteenth Annual Conference on Weights and Measures. A mimeographed copy of this is enclosed herewith for your information.

### *Recommended Tolerances*

The general position taken by the conference was to the effect that tolerances on bread to be recommended to the various officials, are very necessary and should be agreed upon as soon as possible. Your committee concurs in this attitude and in the failure to negotiate satisfactory tolerances with the baking industry proposes to proceed upon its own initiative in an attempt to frame satisfactory tolerances. If a conclusion can be arrived at,

this will be sent to the delegates attending the Fifteenth Annual Conference and a letter ballot taken upon them. If approved upon such ballot the proposed tolerances will be circulated as the expression of the conference upon the subject. In this way it is hoped that they may be available for use before the coming meetings of the State legislatures.

Respectfully Submitted,

JOHN M. MOTE

JOHN J. CUMMINGS

F. S. HOLBROOK.

—Committee on Bread Weight Legislation and Tolerances, Annual Conference.

### *Jewish Bakers Alarmed*

WHEN news reached New York that the Standards Committee of the Conference on Weights and Measures had decided to recommend a uniform bread weight law, with uniform "tolerances" worked out by itself without consulting the wishes of the baking industry, Jewish bakers became immediately alarmed.

New York bakers for the Jewish trade declared that the standards proposed by the Committee on Standards, as to weight units and tolerances would abolish the Hebrew baking business, if applied within New York state.

A conference was called to take action on the matter. It was attended by all of the leading Jewish bakers. They voted unanimously in favor of bread standards, both nationally and in the various states. They appointed a committee to work with Counsel for the American Bakers Association to see that "standards are formulated in Washington that truly reflect the conditions of the industry and do not interfere with normal, usual and customary methods of the manufacture and sale of bread."

### *Losses Through Stales*

WHEN does the loss through the return of stales become serious to a baking concern?

Some bakers who reported losses of 5 per cent on the wholesale value of their production, informed the Food Research Institute of Stanford University that these losses were "unimportant."

Other bakeries reported a loss of  $\frac{1}{2}$  of 1 per cent and declared this loss was most important. Of forty-two bakers who sent in information over twenty were able to keep the losses through the return of stales below 1 per cent. Are you doing as good as that?

Bakers making this fine record declared the practice of accepting stale loaves back from grocers was "wasteful, expensive, and economically unsound."

Of bakers operating under laws forbidding the return of stales, 100 per cent favored the law and liked to work under it.

"Excessive stales" concludes the Research Institute, "threaten the financial success of the baker, tend to raise food costs, and lead to a needless waste of food products."

The Institute urges the need of careful adjustment of production to dealers' actual sales, and agreements among bakers not to take back stales.

### *A Chain Store Note*

"Business conditions in our town are very bad for bakers on account of business-getting drives the chain stores are putting on. One chain store sells the pound loaf for 5 cents and another to go the first one still better sells a pound loaf for 4 cents. That makes it pretty hard on all bakers, and especially the smaller ones like myself."

—From a letter from a Middle Western baker.

What the permanent effect of this development will be is a problem calling for constant observation.



# How Enzymes Aid Ferments

*Their Important Role in the Dough Troughs of the Modern Bakery*

By DR. LOUYS A. RUMSEY, of the American Institute of Baking

**B**ECAUSE every baker comes to know his flours as "strong" or "weak," according to their baking qualities, a scientific curiosity has been aroused to find out what factors make one flour "strong" and another "weak" when it comes to the test of the bakery oven.

A number of universities have put their chemists to work to find out just what happens when a dough ferments and is baked. As a result of their researches the baking industry now knows about gluten and its good or bad qualities, and the importance of having enough gluten present in each mix of flour. It is also known that the changes in flour during fermentation do not simply occur of their own free will and good nature, but that certain "agent" or "forces" take hold and create changes of a most significant kind.

Some of these "agents" we call enzymes. We know that it is possible to create conditions under which they can work with all their power, and then even though they are present in extremely small amounts, they will split up and transform enormous quantities, sometimes thousands of times their own weight, of chemical compounds in baker's flour.

Then again, if we create conditions that sicken and retard them, they refuse to work for us, and leave us a "weak" dough that is unsatisfactory in baking use. Because of this control, which every baker can exert to get either a good or bad service from the enzymes in panary fermentation, it is important that the baker become aware of the laboratory man's researches in this particular field.

We have been experimenting with en-

zymes during two years of work in the laboratories of the American Institute of Baking. It was not possible to deal with enzymes as something the chemist had isolated, as yeast cells were isolated. It was necessary to study enzymes by what they did.

Some were found in yeast, others in flour, and still others in the added ingredients of the dough mix. Of the enzymes in flour itself the most important are diastase, proteoclastic enzymes, phytase and oxidase. When the dough is mixed, the colloids of the flour; i. e., gluten and starch, take up water, and in the presence of this water the different enzymes again start their respective actions.

## *Enzymes in Yeast*

The dough at mixing contains gluten and other proteins, yeast, starch, and a small amount of the sugars which were present in the flour along with that added in the mixing. Although other ingredients may have been added, these are the principal ones necessary for the picture.

In order to live and maintain the growth of the new and parent cells, the yeast takes the sugar, splits it in two, and uses it as fuel. The products of this living process are alcohol, and the carbon dioxide which raise the dough. Because there is so little sugar in flour we usually add two to three per cent of cane sugar or other sugars to feed the yeast and in order that we may obtain this creating gas. It was found that the yeast enzyme, invertase, which the yeast secretes, and which can thus do its work outside the cell, is able to split down most of this

sugar immediately, in order to assure for the yeast cell a sufficient supply of available food.

Zymase, the yeast enzyme which converts the split sugar into carbon dioxide and alcohol as part of the living process of the yeast, is what is called an endo-enzyme; i. e., a substance which acts only within the living yeast cell. Unlike its partner, the invertase, it cannot go outside the cell, but must have food brought to it in the form of dextrose or invert sugar. The carbon dioxide is really a by-product, but it is due to this gas that we get our areating effect in the dough. Obviously the raising of the dough must depend somewhat on the amount and rate at which the yeast can obtain this split sugar. It would seem that you could put in enough sugar at mixing to last the yeast throughout fermentation.

Actually that is not practical because the yeast would be extremely active and use it up immediately, and we know that the texture and grain of the finished loaf depend a great deal upon the activity of the yeast during the last fifty minutes of fermentation, viz., during proofing. Sugar analyses on actual doughs have shown us that the sugar added at mixing is used up long before the dough is ready for the pan but the diastase comes to the rescue and steadily produces sugar in the form of maltose from the starch of the flour, therefore we do not need to load the dough with sugar at mixing.

### *Diastase in Flour*

If the flour does not contain enough diastase, which was found to be the case in some of the weaker flours tested, the yeast suffers for want of food and is unable to give off the carbon dioxide and raise the dough at the right time. The remedy one naturally thinks of is to add more diastase to those flours not having

enough present originally and so get more food for the yeast during the latter part of the fermentation period. Experiments on this point show that the proper small amount of diastase added to those flours which were naturally deficient in these enzymes, will furnish sugar for the yeast, thereby giving the loaf better volume and a finer texture.

While this diastase has been active, the other enzyme changes which are going on must not be lost sight of. The phytase, that enzyme which splits up the phytin and sets free the phosphates, has been working steadily, increasing the phosphates and helping to supply the yeast with one of its necessary nutrients.

The action with which the baker is most familiar, the softening of the gluten, has also been due in large measure to enzymic changes. The proteoclastic enzymes have been gnawing at the gluten, weakening its structure, breaking it down, and making it softer. Proteoclastic enzymes in the flour itself do not seem to be there in sufficient quantity to be of significance, but the proteoclastic enzymes of the yeast are more important. This is especially true if there is an insufficiency of sugar, because if the yeast runs short of sugar it will start using up protein, also if these proteoclastic enzymes are present in too great quantity we should expect the gluten to be broken down too rapidly. If this happens the dough can no longer retain the carbon dioxide and both volume and texture suffer. The ideal combination is that at which the gluten is softened just enough to retain the carbon dioxide produced by the yeast in small bubbles or pockets which will expand easily and rapidly when the loaf goes into the oven. The difficulty that many bakers experience when they add too much diastatic malt is due to the fact that oftentimes this malt contains too much of the proteo-



clastic enzyme. While they are increasing, the diastase which is needed during the latter part of fermentation, they are also adding too much of the agent which is going to tear down the gluten. In practice the baker must reach the balance between these two effects by controlling the per cent of malt.

### *Other Enzymes Active*

There are other enzymes which are also active during fermentation, but we have not yet been able to determine just exactly what part they play nor how important is their function. Of these should be mentioned briefly the oxidases and peroxidases. The use of oxides and peroxides as yeast stimulants in the commercial bread improvers or yeast saving compounds, would lead us to expect that the oxidases or peroxidases also have an influence on the growth and activity of the yeast.

The production of a good loaf of bread is therefore the result of a combination of enzymic changes **most of which are going on at the same time.** The gluten is being softened by the proteases, thereby being better enabled to raise or expand with the increased carbon dioxide to produce a light, fine textured loaf. The raising and expansion of this dough is due to the carbon dioxide gas produced by the zymase working within the yeast cell. The material from which this carbon dioxide was originally made, viz., dextrose or invert sugar, was supplied by the yeast invertase which split down the sugars present in the dough. An important part of the sugar which the yeast must have was produced by the diastase of the flour. If the diastase of the flour was insufficient the baker probably added more in the form of a diastatic malt.

The rate at which these various enzymes are active depends very much upon the other conditions of the dough. They are

extremely sensitive to changes in temperature. The sum total of the actions of all these enzymes gives us the best results when our doughs are fermented around 80° F.

Setting a dough at 90° F. would speed up the activity of the proteoclastic enzymes, and in fact of all of them, to the point where the dough would be ruined if it fermented as long as the cooler dough. However, the effect of increased temperature on diastase is to be desired. One of the reasons for raising the temperature during proofing is because the diastase produces sugar from the starch at a more rapid rate and this sugar in turn is needed in greater quantity to feed the yeast that it may produce carbon dioxide to raise the dough in the pan and form the loaf. These various enzymes are likewise sensitive to the hydrogen ion concentration of the dough.

The acidity at which the diastase is most active in the dough is at a pH of 4.7. The acidity of the dough at mixing is more nearly that of the natural flour and is probably between a pH of 6.3 and 5.8. As fermentation proceeds the acidity gradually increases until it may reach a pH of 5. This increase of acidity in the direction of the greatest activity, also helps make the diastatic action more efficient at the point where it is most needed during fermentation. The amount of water absorbed by the dough controls also the activity of the enzymes. As a matter of fact, they never reach their maximum activity because there is insufficient water present. When the bread goes into the oven the temperature is quickly raised up to and past that point where the enzymes can function. The effect of the enzymes, therefore, during the time of baking is of little consequence and the temperatures finally reached destroy the enzymic activity.

### *About a Bread Assault*

IT WAS with a great deal of interest that I read in the last issue of Baking Technology an article on Dr. Woods Hutchinson's assault on bread.

Having read the article referred to in Collier's, and noting his denunciation of bread as "this most unwholesome cereal," I was rather surprised on reading an article in Hearst's, by this same learned gentleman, in which he tries to convince us that Prohibition has made good, and gives as one of his reasons, that due to the fact that the barley and grain, formerly used for making alcohol and mash, was now being used to make thousands of tons of NOURISHING BREAD, etc. I say "Three cheers for the Learned Doctor". He is on the right track at last, and is now probably learning, what the leading food experts and medical men of the world have learned years ago, that bread really is a most nourishing food.

I say, give the Doctor a free scholarship in our American Institute of Baking, and let him learn the nutritive value of our staff of life, and how it is made, and perhaps his next article on this subject will be more readable.

Congratulations on your splendid paper. I am looking forward to the next issue.

A. HANNIBALL, Jr.,  
Mgr. Franco-American Baking Co.,  
New York City.

### *"Wanted—Experience"*

SIGNED on at the shop where I am now working as a bake shop helper for three months and so far I have done more with the broom and mop than I have with the mixing bowl and the dough trough. I wouldn't mind the clean-up work if I were able to get more experience than I do.

The work is quite hard as there are no

machines in the place. Beating up 60 eggs and 3 pounds of sugar for from half to three quarters of an hour isn't exactly my idea of nothing to do.

The pastry chef doesn't believe in teaching his helpers anything. For instance, if he is making pies he rolls the crust, I wash and fill them and the other helper bakes them. If he is working on something special he chases both of us out of the shop and does it himself. Then, too, a helper dare not do anything on his own hook, for he never does it just right, while if he doesn't do anything on his own hook but asks the chef what to do next, said chef flies off the handle. I am anxious to qualify for a better position, and what I lack now is actual bake-shop experience."

—From a Bakers Apprentice's Letter to  
Our School of Baking.

It was precisely for this young man and his kind that the leaders of the American baking industry set up a School of Baking. It was for their personal welfare,—but also for the good of the industry through the bringing into it of such youthful enthusiasm and the will to learn.

Baking Technology is a very good Journal and I have read with a great deal of interest the material it contained. I appreciate the difficulty you work under in trying to prepare a Journal that is adaptable both from the scientific standpoint and from the general bakers' view. I think you have succeeded very well.

WALKER EMMONS,  
Laboratory Dept., Washburn-Crosby Co.  
Minneapolis, Minn.

Your publication in its self is a great help to the baker that will read it, and it sure will be a greater help to the baking industry if the men in it will avail themselves of the opportunities offered.

EDWARD C. A. JOHNSON,  
Proprietor Star Bakery, Virginia, Minn.



## A Book for the Bakery Owner

TRADE ASSOCIATIONS, THEIR ORGANIZATION AND MANAGEMENT. By Emmett Hay Naylor, Secretary-Treasurer of the Book Paper, Cover Paper, Tissue Paper, and Writing Paper Manufacturers Associations; President American Trade Association Executives. 390 pp. The Ronald Press Company, 1921. Price \$5.00.

Every baker who ever mistrusted the American Bakers Association, and said it ought to fail because it did not fire out this or that "hated competitor" ought to read this book. He ought to read especially the chapter on competition and cooperation. There he will learn how various automobile companies, for instance, standardize tire sizes, width of traction, bearings, valve stems and the like. And yet fight fiercely for business, each maker against his neighbor.

The hardest thing those at the headquarters of the American Bakers Association have had to contend with is the foolish notion of some bakers that because they join an association their competitors, who have also joined, must immediately cease all competitive activities. The fine thing about Mr. Naylor's book is that it will take its baker reader through the story of association after association, under conditions of disinterested leadership. It will show the baker how each learned to cooperate, and at the same time respect and recognize the competitive nature of life in the fight for trade.

The baker can learn from this book how rapidly some industries "educated" themselves until they were suddenly doing vastly more work than they had ever been able to do in the days before they organized. It tells, for instance, how the face brick manufacturers filled the country with propaganda in favor of faced brick as a building material and then fought

each other as real competitors for the new business that was created.

In these days when organized food industries are putting their products into the hands of all the hungry, in a way to crowd the sandwich from its historic pre-eminence, no baker can afford to ignore the problem of building up a National home and a National headquarters.

If any baker has let his heart become filled with hardness towards his organization because of uninformed gossip, or spiteful tales of "short circuit" personalities he ought to find this book full of comfort for him. The present writer has not heard any "knock" against those whose shoulders are to the wheel, in the matter of building up the American Bakers Association, that is not repeated in this book concerning all other leaders. The price of leadership seems to be that the leader has to be "picarooned" by just so many foolishly flung shafts, no matter what line he forges ahead in.

Mr. Naylor lists them all, and then he lists 800 trade associations which have developed a National status. Since all "waded through" and the disintegrating forces were identical in all, this book leaves a hopeful prospect that the baking industry will reach a greater and greater goal each year. He calls his book "a detailed analysis of the purpose, structure, procedure, and value of the modern trade association." It would be interesting to see if any stubborn baker who has only evil and suspicion towards his own National organization could withhold his application for membership after absorbing the 390 pages of this expert's volume.

## Abstracts of Technical Articles

### Selected for Baking Technology from *Chemical Abstracts*

#### Maintenance Ration-Function of Carbohydrates.

H. Bierry. *Compt. rend. soc. biol.* 82, 530-3 (1919). *Expt. Sta. Record* 41, 670.—B. criticises the work of Maignon (*C. A.* 13, 1221; 14, 3103), particularly on the role of fats and carbohydrates in metabolism, and suggests that the apparent contradictions between his experimental results and those of other workers are due to the fact that the proteins and fats used by Maignon were not pure, but contained carbohydrates and more or less of the accessory factors fat-soluble A and water-soluble B. A maintenance ration must contain a certain quantity of carbohydrates, the amount depending on the chemical structure and function of the carbohydrates in question and of the other food materials which enter into the composition of the ration. E. H.

#### Maintenance Ration-Function of Carbohydrates.

F. Maignon. *Compt. rend. soc. biol.* 82, 806-808 (1919); *Expt. Sta. Record* 42, 365.—A reply to the criticism of Bierry previously noted (preceding abstract).

#### Nutritive Value of Some Preserved Foods. J.

Athanasiu, G. Pampil and P. Stavresco. *Compt. rend. soc. biol.* 83, 568-71 (1920); *Physiol. Abstracts* 5, 472. Full analyses are given of diet, urine and feces of 10 men while feeding on a variety of preserved foods. The proteins of white beans and maize were less easily digested than those of bread and meat. The starch of white beans and maize was less completely digested than that of bread and vegetables. Preserved meat was not so easily digested as boiled or fried. The smallest values for the percentage of nitrogen digested were observed on diets of beans and maize. E. H.

#### Antiscorbutic Value of Dehydrated Fruits. Philip F.

Eckman. *J. Am. Med. Assoc.* 78, 635-6 (1922).—Experiments were made with 4 series of guinea pigs. The basis of their diet consisted of a mixture of equal weights of alfalfa meal and white wheat flour with 1% NaCl. This ration was fed in unlimited amounts. The dried fruits tested were peaches, apricots, apples, pears, prunes, cherries and loganberries, precaution being taken to insure uniform quality of these products. Peaches were the only dried fruit fed in moderate amounts (4 g. per day) that would sustain life for

several months. Even with peaches scurvy was not prevented but only delayed. L. W. Riggs.

#### The Determination of Egg Substance in Baked Products. O. Noetzel. Z. Nahr. Genussm.

42; 299-302 (1921).—Errors are introduced in Juckenack's determination when phosphate baking powder has been used, and in yeast baked goods owing to a slight alcoholic solution  $P_2O_5$  formation during fermentation. To extract completely the alcoholic solution  $P_2O_5$  from dried products 2 extractions are necessary. Between extractions the sample is ground to a paste with  $H_2O$  to free the remaining alcoholic solution  $P_2O_5$  and dried before re-extraction. L. D. E.

#### Malted Commercial Flours and Malt Flour. E.

Perrot and R. Lecoq. *Bull. sci. pharmacol.* 29, 65-7 (1922).—The malted flours of commerce furnish gruels which are but slightly malted, the starch of which is for the most part undigested. The addition of malt flour increases the maltose formation. F. S. Hammett.

#### Some Factors Related to the Quality of Wheat and the Strength of Flour. W. L. Stockham.

N. Dakota Agr. Expt. Sta. Bull. 139, 69 pp. (1920).—A full discussion is given of the factors involved in giving strength to flour. This strength is determined by the ability to make a loaf of good texture. The chemical composition of different varieties of wheat and flour are discussed and studies made of chemical changes which take place in them on storing and with different treatments. Many factors involved in bread making are discussed in a practical way. M. S. Anderson.

#### Report on Eggs and Egg Products. H. L.

Lourie. *J. Assoc. Official Agr. Chem.* 5, 191-5 (1921).—Preliminary study shows that  $CH_3OH$  etc. more lecithin  $P_2O_5$  from flour and eggs than does  $C_2H_5OH$ . Two methods for detn. of Zn in egg products are given. H. A. Leper.

### PATENTS

#### Starch-Conversion Products. R. E. Bright. U.

S. 1,411,203-4, Mar. 28.—A dry starch degradation product adapted for use in improving dough is prepared by treating starch with 0.5-1% 11 degrees Be.  $HCl$  and heating the mixture until substantially all  $H_2O$  is driven off and continuing the heating until a product containing over 6% of mono- and poly-saccharide sugars is obtained.



# Killing Your Association

*Some of the Ways an Expert Finds it Often has Been Done*

**I**N THESE speedy days the bakers of America have captured mother's "intuition" about how to bake good bread and reproduce her finest loaves at every bake. Chemical exactness does away with all guess work.

Now comes an expert, E. H. Naylor, who has written a code for us on just how to kill a National Association. Here are its articles as they appear in "Trade Associations."

1. Don't attend your conventions, either of the local at home or of the National.

2. If you do attend find fault with the work of everybody who has been on the job.

3. Never accept an office; it is easier to criticise than to do things.

4. Nevertheless get sore if you are not appointed on a committee; if you are do not attend the committee meetings.

5. If asked by the chairman to give your opinion on some important matter tell him you have nothing to say. After the meeting tell everyone how things ought to be done.

6. Do nothing more than is absolutely necessary; but when others roll up their sleeves and willingly, unselfishly, use their ability to help matters along, howl that the association is run by a clique.

7. Hold back your dues as long as possible or don't pay at all.

8. Don't bother about getting new members. Let the secretary do it.

9. When a banquet is given tell everybody money is being wasted on blow-outs which make a big noise and accomplish nothing.

10. When no banquets are given say the association is dead and needs a can tied to it.

11. Don't tell the association how it can help you. But if it doesn't help you, resign.

12. If you receive service without joining, don't even dream of joining.

13. If the association doesn't correct abuses in your neighbor's business, howl that nothing is done.

14. If it calls attention to abuses in your own, resign from the association.

15. Keep your eyes open for something wrong and when you find it resign.

16. At every opportunity threaten to resign and get all your friends to resign.

17. When you attend a meeting vote to do something and then go home and do just the opposite.

18. Talk cooperation for the other fellow with you; but never cooperate with him.

19. When all else fails, curse the secretary.

20. If you don't receive a bill for dues, don't pay.

21. If you receive a bill by mistake after you have paid, resign from the association.

22. Agree with everything done at a meeting and then disagree with it loudly outside.

23. When asked for information by the Secretary, don't give it, and demand to know whether you pay him to be a ready letter writer.

24. Get all the association gives, but don't give anything in return.

NOV 10 1922

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association.*

Vol. I

CHICAGO, ILLINOIS, OCTOBER 15th, 1922

No. 10

## Bread of Life and Growth

A SUPER loaf of bread, created in the scientific laboratories of American bakers and in the laboratory of the American Institute of Baking, out of such ingredients that it will by and of itself fully sustain life, is the promise of the baking industry to America's diet of tomorrow.

A super-organization so that in full pride for their industry the bakers of America will be able to march unitedly forward to greater days of service to their civilization, is the promise of Tomorrow within our ranks.

New England and Pennsylvania lead the way. The Potomac States follow

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shortly after and the Southeastern States come swinging along to the same kind of a get-together tune.

One era in the history of the American Bakers Association ends with the announcement now made that the New England Bakers Association, has, as an association, become a member of the American Bakers Association.

For years a few enlightened bakers pioneered the long trail towards a Na-

tional association of strength and power. There were no strong state associations in those days and the National numbered only a hundred or two members. These alone struggled with problems that when



solved, benefitted all of the thousands who would not join.

Within the past few years strong state associations have become foundation pillars on which the National roof can rest. New England's strong sectional organization was first perhaps to sense this opportunity, although Pennsylvania took action on the same day and the Potomac States association was hardly a moment behind.

The idea of federating the National with state organizations was broached in a strongly made plea by Walter H. Dietz, treasurer of the New England Bakers Association last September. He had worked hard to build up the New England association. He found he could not attend the National convention and he sent his letter on as his contribution to a proposed reorganization discussion.

Elwood M. Rabenold, chief counsel of the American Bakers Association, read the letter of Mr. Dietz to a group of bakers in New York. They quickly agreed with its principles. They agreed that the time was ripe for federation.

Counsel Rabenold drew up an amendment to the Constitution which permitted any "trade association whose members manufacture bakery products" to become affiliated with the American Bakers Association "by declaring its adherence to the constitution and, on behalf of the bakery plants of one or more of its own members, within its jurisdiction, paying the dues fixed by the American Bakers Association."

The amendment was passed unanimously at the annual convention in September, and the way was thus opened for action in all states and sectional organizations.

New England was first to hold a convention after the trail had been blazed for Federation. Its convention at

Swampscott, Oct. 2, passed a resolution containing these three provisions:

1. That the New England Association join as an association member of the American Bakers Association.

2. That the Treasurer of the New England Association receive and forward dues paid for that purpose by any member of the New England Association who wished to take advantage of the Association membership plan.

3. That the voting power in the American Bakers Association, accruing because of the Association membership, should be exercised "according to the determination of the Executive Committee or the Board of Governors."

On the same day that the New England Bakers Association met at Swampscott, Mass., the Executive Committee of the Pennsylvania Association met at Harrisburg, Pa. Raymond K. Stritzinger was able to represent both National and State power at this meeting for he was both president of the State association and a member of the Board of Governors of the National association.

He knew the plan to federate State and National Associations, and he was able to explain it in a way to obtain its full indorsement by the Pennsylvania association's executive committee. The committee passed a resolution applying for association membership in the American Bakers Association, the State association, as a member of the National, "to have as many votes as might be assigned to it by plants who are members of both associations."

With commendable alacrity the Potomac States Association stepped into line. At Cumberland, Md., on October 10th, the regular Executive meeting of the Association voted unanimously to indorse the "association membership" plan.

# A Bakers' Sanitary Survey

*Dr. William C. Witte of the U. S. Public Health Service Tells How  
He Finds Our Industry*

**W**HATEVER any baker thinks of any sanitation problem, the fact is very clear to all who have studied bread merchandizing that women hesitate to buy bakers' bread mostly because of the fear of unsanitary bakeries.

"What," said a woman who always baked at home when an inquirer from a baker reached her door, "buy bakers' bread when I know a hairy-armed man punches up the stuff in a dark room and then carries a big wad of dough against his own breast up to the baking room? Buy bakers' bread, not much!"

The woman who made that reply crunched up in her hand the loaf the inquirer showed her as a sample of bakers' bread. She brought her own loaf out to exhibit its virtues in contrast.

The inquirer went away and bought some new bread pans. He moulded his own loaf on that woman's loaf. He invited men and women to his bakery. He told the story of what the woman charged and explained that she had "carried forward" from her girlhood a memory of a condition that had long since passed.

He began really to "sell" bread, and put an advertising appropriation on every loaf that went over his counter. This advertising fund he put into teaching the people about his SANITARY shop.

Now he is one of the biggest bakers of the country. Once he grew disheartened because of the refusal of certain bakers to see that CONVINCING THE WOMAN of the sanitary background of bakers' bread was the KEY TO SALES of vastly increased quantities of it.

He poured out his heart to Jay Burns of Omaha some years ago, and Jay Burns,

being the son of a preacher and being a teacher by nature, poured his whole heart out into a speech at Louisville, dubbing a certain faction of the Baking Industry "cockroach bakers." He wanted all who would follow away on a platform of SANITATION to step apart and assume a place of progressive leadership. That speech of Jay Burns, twisted and colored into an assault upon ALL SMALL BAKERS by a BIG BAKER, has done service on the lips of hundreds of disorganizers who want to keep the American baking industry factionalized. Jay Burns spoke far ahead of his day, of course, but he carried the flag in the direction in which the Industry makes its most rapid strides. As a prophet he awaits a day of vindication, as is usual in all such challenging situations.

The W. E. Long organization, for instance, spends more money in its advertising drives to convince women that bakers' bread is now a sanitary product baked under healthful conditions than it spends in any other direction. It focused on this point—and created bakery conditions to back up its advertising—after a careful survey made by personal visits to over 10,000 housewives who home-bake their bread. And he knows the plan wins new business.

## *Federal Co-operation*

The American Bakers Association received a splendid offer of co-operation by the Federal government with an intent to create by joint action a progressive and EDUCATIONAL improvement within the baking industry. There was to be no coercion in it, and no "YOU MUSTS" in the



suggestions of the Federal government's service.

On the other hand, there were to be helpful suggestions for any baker who wanted them, which would tell the baker just the conditions to aim at as ideal. At the end of this campaign the American Bakers Association general offices saw a great chance to send out comforting and assuring messages to American homes. These were to be to the effect that every home-head could now rest assured that the highest expectation of the U. S. Public Health Service had been realized in the production of the Bakers' loaf.

Dr. William C. Witte, passed assistant surgeon of the U. S. Public Health Service, was assigned to make a survey of the industry, to determine its present condition and its needs. Most always he was welcomed. Some few were suspicious, for they remembered resentfully the old type of "inspector," with a curt jaw and a way of ordering in vastly expensive "improvements" that seemed to afford nothing but big expenditures.

His report, making an important gesture towards the Future, is herewith published for the information of all bakers who are interested:

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### *Dr. Witte's Survey*

September 27, 1922.

To President William H. Korn and the Board of Governors, American Bakers Association:

Gentlemen—I desire to submit a report of the activities of the Sanitary Service for your information. I was detailed to duty with the American Institute of Baking on March 16, 1922, for the purpose of developing a sanitary inspection service, using the Sanitary Code of the American Bakers Association, which had been adopted by its Board of Governors subse-

quent to the annual convention September 20th to 22d, 1921, as a basis for this development. At the time of my assignment it was understood that the American Bakers Association were interested in putting their own inspectors into the field and it was to be my duty to organize these men into a service for the purpose of inspecting plants of members of the Association and plants of prospective members of the Association.

However, on account of the fact that the bakeries were already being inspected by official agencies of the various states and cities in which they were resident, namely, the state food and dairy, or the state food and drug commissioners, or the state board of health, it was deemed inadvisable to employ additional inspectors. It was thought best to secure a sanitary survey of the members of the Association through the already existing agencies by requesting their co-operation and offering to assist them in correcting any insanitary practices found; consequently letters were addressed to the officials, enclosing the sanitary code of the Association and asking for their co-operation. The results from this were especially gratifying, as only seven states stated that they could not co-operate, giving as their reason one of the following: Not legal, insufficient appropriation, insufficient personnel, or inspection reports considered entirely confidential.

### *A New Inspection Blank*

An inspection blank was devised upon conference with the Industrial Hygiene Division of the Public Health Service for use in securing the data requested. This blank, while very comprehensive and by some considered too complicated, was devised for the purpose of securing all data concerning sanitary conditions at the various plants, employment data and health

conditions affecting the workers in the industry. As this survey progressed and the reports were received, it was noted that there were but few plants in which employment records were available for study to determine the health conditions of the industry.

In order to augment our records somewhat and to secure this very valuable information, it was decided to approach the industry with the idea of having several of the members install personnel record cards. While this request did not meet with complete response from the industry, there were a number of bakers who felt that it was a problem which should be considered and were willing to install this record and make a study of absenteeism at their plants.

In connection with this matter a communication was addressed to four of the larger insurance companies regarding the insurance risk of workers in bakeries. The reports from these companies would indicate that the occupation of journeymen bakers was considered as hazardous. In fact, one insurance company stated that they would insure only the best from a physical standpoint of journeymen bakers.

### *Physical Condition of Bakers*

The physical condition of bakers has been studied to some extent and a comprehensive report prepared by Dr. Louis I. Harris and Dr. Louis I. Dublin, entitled, "Health of Food Handlers," showed that of 274 bakers examined, 207 gave evidence of some disease or defect and only 67 were entirely free from disease or defect. The U. S. Department of Agriculture, in its Bulletin No. 306, entitled "Occupation Hazards and Diagnostic Signs," sets forth three hazards of the baking industry, namely, the sudden variations of temperature, organic dust and carbon monoxide gas, attributing to these hazards some of

the following symptoms and diseases: Catarrh, neuralgia, pneumonia, Bright's disease, cough, asthma, bronchitis, emphysema and tuberculosis.

In the survey which was made there were but few notations made of hazards by the inspectors, excepting that some noted flour dust as being abundant in the blending rooms, around sack cleaning machines, and in mixing rooms. The survey brought out very forcibly the fact that the average employer of bakers has given but little consideration to the matter of medical supervision of his employes, and for that reason, and because of the reports above mentioned, it is suggested that the study of absenteeism in the bakeries be carefully followed up.

There were some difficulties experienced in securing data in this survey because of the fact that the blank was considered by most of the inspectors as somewhat complicated and requiring training which they stated they did not have. The inspectors were scattered in various parts of the United States, and as it was impossible to secure a conference at a certain point of these men, there is a difference in methods of reporting of findings. As in all inspection work or survey work, the personal equation in reporting data is a big factor in securing uniformity of reports. However, it is felt that the information secured is especially valuable and can be used as a basis for encouraging more thought to sanitary practices and developing the sanitary standards of the baking industry to a plane consistent with modern sanitary thought, with an idea of protecting the general public health and the health of the workers in the industry.

### *Summary of Survey*

The following is a summary of the survey of 97 bakeries, members of the American Bakers Association. These plants



employ a total of 3,789 people, of which 645 were females and 236 minors.

Reports concerning labor turnover at these plants showed variances of from 12 to 50 per cent per year. In only 21 of these plants were there any employment records which would be available for study, making it rather difficult to secure definite data concerning employment, labor turnover, etc. In 44 of the plants there were noted causes of absenteeism. These causes ranged from sickness 26 reports to discontent 1 report. Some of the other items noted were inefficient help, sickness and restlessness, and pleasure.

With regard to buildings housing these plants, the reports showed that they varied from old frame store buildings to the most modern of factory construction. Thirty-seven were reported as being of modern factory construction. These were plants in which bread and cakes are manufactured for wholesale trade only.

With regard to screening of the building, it is noted that 70 were completely screened and 27 were incompletely screened.

With regard to storage of raw materials, the reports show that in most instances a separate room was provided for this purpose and that they were stored in an orderly manner with proper provisions for the protection of the supplies from the depredation of rodents and effects of climatic condition. In only 12 of the plants was there any notation regarding health hazards in the store room. The statement showed that most often this was dust.

With regard to general housekeeping of the store rooms, 43 were reported as good, 45 as fair and 9 as bad. Thirteen reported evidence of rodents in the store room.

### *Laboratory Supervision*

With regard to laboratory supervision of raw materials, including the examina-

tion of flour, milk, sugars, fats, etc., only 25 plants reported that this was being carried on.

With regard to general sanitation of the work rooms, it is noted that practically all of these were of ample size to provide good ventilation and light for the workers and in a great percentage of the cases separate rooms were provided for mixing, fermentation, make-up and oven rooms. In only nine plants was it noted that sweeping was done during working hours and in practically all of the plants it was reported that the floors were swept daily and scrubbed once or twice a week. Dust hazards were reported in 29 plants, this, of course, being flour dust, and was reported as prevalent in mixing and make-up rooms. In three plants it was reported that there was excessive heat present in the oven room.

With regard to equipment of the plants, it is noted that in 45 there was complete automatic machinery installed. It is obvious, however, that in these plants there was some hand work. In 47 of the plants part of the work was machine and the remainder bench work. In only 5 plants was it reported that there was no machine work being done.

In 63 of these plants the cleanliness of the machinery and equipment was reported as good, in 30 as fair and 4 as poor.

With regard handling of products, that is, the protection of the finished product from contamination, including the wrapping of bread and the proper care of cakes and sweet goods in stores, the conditions were reported as good in 46 plants, fair in 46 and poor in 5.

With regard to personal service facilities, toilet rooms were properly located in 65 plants and improperly located in the remainder. The cleanliness of these rooms was reported as follows: Good in 53; fair in 38, and poor in 6.

Washing facilities were provided in all plants; 83 plants furnished hot and cold water and 14 cold water only. Soap was furnished in 85 plants and not in 12. Towels were furnished in all but 18 of the plants. In instances where they were furnished in 47 plants it was reported that common roller towels were in use, in 15 individual linen towels were provided and in 17 individual paper towels were provided.

With regard cleanliness of workers' hands, 72 reports showed good, 23 fair, and 2 poor. With regard to cleanliness of workers' nails, it was reported in 31 plants as good, 62 plants as fair and 4 plants as poor.

Sixty plants were reported as providing locker facilities for the protection of workers' clothes. The cleanliness of these lockers was reported in 34 plants as good, 20 as fair and 5 as poor. Special clothing was in use in 68 plants and was provided in 60 instances by the workers and in 8 by the plant. This clothing was cleaned daily in 11 plants, semi-weekly in 40, weekly in 10, and as needed in 7.

With regard to bathing facilities, in 51 plants this was provided, either showers or tubs in use and soap and towels being furnished. In 46 plants no bathing facilities whatever were provided for the use of the workers.

### *Sanitary Bubbling Fountains*

With regard drinking facilities, sanitary bubbling fountains were found in 22 plants; ordinary faucets were in use in 66 and in 9 plants the water was kept in pails or buckets. In 57 of the plants common drinking cups were in use.

With regard to rest rooms and rest periods, only 12 plants reported rest rooms and in only 2 was it reported that rest periods were in force.

With regard medical supervision of em-

ployes, it is noted that in 19 instances arrangements were in effect with insurance companies for the care of industrial accidents and in 22 plants first aid outfits were provided, and in only two plants was there a first aid room under the supervision of a nurse. Physical examination of workers was required in 52 plants. This was in accordance with state laws in effect in two states, namely Indiana and New York. Medical certificates were required in 51 instances and has the same relation to state laws as does physical examination.

The sanitary score of the plants was as follows:

- 12 were scored between 90 and 100.
- 17 were scored between 85 and 90.
- 16 were scored between 80 and 85.
- 16 were scored between 75 and 80.
- 8 were scored between 70 and 75.
- 12 were scored between 60 and 70.
- 16 were scored below 60.

### *A Gradual Improvement*

A summary of the above report shows that there has been a gradual improvement in bakery sanitation, but that there is needed more thought to this matter and an education of the employer and employe to the advantages of sanitation, with an object of developing in them a sanitary conscience. It is felt that an effort should be made to continue the co-operation between the industry and the enforcement officers in the various states and municipalities, with a view of adopting uniform laws and regulations governing the sanitary practices in food establishments.

It is believed that the more important points to be stressed in these regulations concern the hygiene and the health of the workers of the industry. I would recommend that the industry encourage the states to adopt laws requiring the physical examination of all bakery employes and the furnishing by them of medical certificates



before employment, subsequent to illness and periodically throughout their employment. I would also suggest that the employers be encouraged to provide ample personal service facilities for their employes and especially to do away with the common towel and the common drinking cup which our survey shows were in use in a large percentage of plants.

### *Conclusions*

1st. Bakery sanitation is indicated for three reasons:

(a) Protection of product from contamination and spoilage.

(b) Protection of the public health.

(c) Protection of the worker in the industry.

2d. Considerable improvement in bakery sanitation is still necessary, especially in regard to handling of finished product, hygiene of the workers, personal service facilities and the laboratory supervision of raw material.

3d. Consideration of medical supervision of bakery employes with a view to reducing health hazards and the prevention of accidents is necessary.

4th. Universal adoption of automatic machine is advisable.

Respectfully submitted,

WM. C. WITTE,

P. A. Surgeon U. S. Public Health Service.

### *The American Institute*

THE bakers of America forged far ahead of many other industries when they flung, almost full-fledged, the American Institute of Baking into the midst of affairs. Industries that are among the greatest, such as Steel and the Packers, are just beginning to talk of their Institute, their "research program" and the "school to replace the apprenticeship system."

Watching industry while its standards and methods have shifted through a cycle of nearly half a century, J. N. Hurty has remained on duty in the Indiana State Board of Health. He has helped to drive many an industry towards higher sanitary standards. Recently he came to the American Institute of Baking to pay us a visit. On his return home he wrote this summary of the way the work of America's bakers registered upon his mind:

"As soon as I entered the Institute I could perceive that it was scientifically organized; everything seemed to be in the right place and every function seemed to be proceeding effectively.

"The American Institute appeals to me as a practical institution built upon a firm foundation. The good it will surely do in uplifting the baking industry can hardly be estimated. A sickly Nation like a sickly man is of very little value. He cannot get very far, and so if it is possible to raise the standard of public health through the American Institute of Baking, something more than a commercial interest will be advanced.

"I cannot congratulate too highly our Indiana fellow citizen, Dr. H. E. Barnard, in being at the head of this really great institution.

### *Who Wants This Job?*

THE Consumers Pie Co., of Brooklyn, N. Y., writes that it desires a man with the necessary qualifications to become "foreman and production manager."

"The man we want," the letter continues, "should know something about baking pies. But what is more important is that he should know how to handle men, and should know how to direct them in a way that will be conducive to the development of a high grade product.

"We have in a few short years attained the pre-eminent position of being one of the largest pie bakeries in the country. We bake and sell an average of from 15,000 to 20,000 pies per day and could undoubtedly increase this volume if we could get the right man to supervise the production of our business.

"The age of the man is immaterial. Neither do we care as to his nationality. We are prepared to pay the right man an excellent salary to commence and his compensation will be increased commensurate with his ability and results."

That's the map of the field. Where is the production manager to step up and say he qualifies?

Isn't this company's trouble due to a post-war condition at Ellis Island? Once the finely trained bakers of Europe flocked here in a steady stream and knocked at the doors of such places as this one for Opportunity. Now the only way to get them seems to be to educate them. For exactly that reason almost every student in our School of Baking is "spoken for" in advance by some large baking concern that has sent him here. That we shall be able to create a roll of men capable of doing the work here described is one of the hopes of these headquarters.

#### STATEMENT OF THE OWNERSHIP

Of BAKING TECHNOLOGY, published monthly at Chicago, Ill., for October 1, 1922.

State of Illinois, County of Cook, ss.

Before me, a notary public, in and for the State and county aforesaid, personally appeared I. K. Russell, who, having been duly sworn according to law, deposes and says that he is the Editor of the BAKING TECHNOLOGY and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—The American Institute of Baking.

Editor—I. K. Russell.

Managing Editor—None.

Business Managers—None.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders, owning or holding 1 per cent or more of the total amount of stock.) The American Institute of Baking, a Corporation not organized for profit; H. E. Barnard, Director; J. M. Livingston, Chicago, Chairman; R. R. Beamish, Los Angeles; H. V. Keiser, Springfield; Gordon Smith, Mobile; A. L. Taggart, Indianapolis, Directors.

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I. K. RUSSELL,  
Editor.

Sworn to and subscribed before me this 22nd day of September, 1922.

ROSABELLE E. PRIDDATZ,

(My commission expires Aug. 24, 1926.)  
(Seal.)

### About Memberships

UNDOUBTEDLY you have been told of the decision made regarding the New England Association becoming affiliated with the National association. Personally I think that this is the finest thing that could happen, as I believe the only way big things can be accomplished by the baking industry is to have matters taken care of by the National association. This will simplify matters greatly and do away with a lot of detailed work being done by separate associations. I hope it will not be long before associations from all the different states join with the National association.

—From a letter from Governor C. O. Swanson, Hartford, Conn.

Mr. Swanson is one of the men who has given his energy without stint to the building up of the New England Bakers Association. Now he takes one step more and works for his National association, with the same unselfishness and zeal.



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

Entered in the post-office at Chicago, Illinois, as second-class matter, under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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OCTOBER 15, 1922

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### *We Work Together*

***To win through quality production  
and the utilization of scientific research  
a welcome for two loaves of bakers' bread  
for every one that now finds favor.***

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### *The Newer Unity*

**B**OTH by stronger association ties and by scientific advances in our laboratories will the breadstuffs industry of America go forward. We are now beginning to think of "bakers" in the terms of baked products, and not in terms of bread alone. The chain store baker, the pie baker, the macaroni baker, the neighborhood baker, the syndicate baker, the whole-sale baker, the cake and sweets good baker, are all finding common cause in work for scientific research, and for the winning of a better public confidence in baked goods.

The Retail Bakers Association propose that Sam Goetz, the best natural born teacher in Bakerydom, shall open a "sweet goods" short course in Chicago, in November. It will be a splendid course, of great value to every baker who can attend it. They will learn how pure, natural ingredients lure the appetite, and how synthetic substitutes drive appetite away. Sam Goetz has led hundreds of bakers towards an interest in the scientific phases of the

baking industry. Many have passed from his extension courses to the regularly organized schools such as that of the Dunwoody Institute in Minneapolis and the Siebel Institute in Chicago.

We only wish that an offer of the rooms and laboratories of the American Institute would be acceptable to Mr. Sam Goetz and that his Chicago course could be given in our rooms. We would feel honored by the opportunity to join thus in a service of such great value to the industry.

The retailers must watch the sales tax, for they are likely to be double taxed both as retailers and as manufacturers. For unlike most retailers the retailers of bread manufacture the product they sell. The whole baking industry, as a matter of fair play, will wish to watch the sales tax situation and see that no such injustice is done. In Canada the injustice has been done and retail bakers are refusing en masse to pay the sales tax, while the whole industry helps them to fight for fairer consideration in the name of "British Fair Play."

The laboratories of the American Institute are owned by bakers for bakers and are open to all. No propaganda in favor of any cause or any product lurks in the background of their organization. From them will be flowing data of great value to the industry AS A WHOLE. And every tone and tendency towards a Newer Unity is a tone and tendency towards STRENGTH, where weakness, faction, schism, and disorganization have previously prevailed.

### *More Congratulations, Mr. Helms*

**L**AST month the baking industry of America heard emphatically of the existence of Mr. Paul Helms and Albert Fox, president and secretary of the Hall Baking Co., of Buffalo.

This was when they held aloft the banner of the *QUALITY LOAF* so emphatically at the National Exposition for the Baking Industry that they won the prize for the best loaf shown, out of 350 submitted for judgment.

Now we find it necessary to congratulate Mr. Helms once again. He has been selected as a trustee of Syracuse University, from which he graduated only 10 years ago in the class of 1912. Thus he becomes the youngest Trustee ever selected for this important post. His success in baking a conspicuously fine loaf of bread had quite a little to do with his being chosen for a place among the guiding forces of this important University, we are informed by the newspaper accounts of his appointment.

There is another important item in the life of Mr. Helms. It illustrates how the modern baker lets modern machinery do the "heavy work" while he seeks contacts and responsibilities in the community of which he is a part. Mr. Helms is a member of the Country Club, Chamber of Commerce, Buffalo Consistory Ismailia Shrine, Beta Theta Pi fraternity, Buffalo Athletic club, University club and Rotary club.

He helps to win, of course, for baking in his community a degree of respect and public confidence of which the industry as a whole constantly becomes more worthy. Jay Burns was the prophet of progress in this direction. And as such, of course, suffered the prophet's usual fate of being misunderstood and maligned while the thing he stood for went steadily on to a well comprehended success.

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### *Good for Maryland*

**I**N THE spirit of disorganization and dismay which accompanied the "stepping down" of the baking industry from war-time conditions bakers in Maryland very generously tried to outbid each other

in taking back stale bread from grocers.

They worked up serious losses for themselves. Then at last they met and sent a notice to all grocers that the practice would be discontinued as a bad one for the public, for the grocers and for the bakers. The inforcement of the new order was placed in the hands of P. August Grill, and all bakers of that section will wish him much strength in his good right arm while he wipes out this old, unsanitary, uneconomic practice.

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### *A Contrast*

**W**HEN he was a young man William H. Korn, president of the American Bakers Association, was much afflicted with the wanderlust. He wandered to Chicago and worked for a time in a bakery that was built on the then standard plan of all hand work.

In his own life he watched for every new improvement and adopted every one that turned out to be worth while. He never turned an Allied Tradesman away until he knew all about the wares that somebody thought good enough to send to him at the expense of a salesman's personal journey.

Progress, of course, is something without end. We met Mr. Korn this week on his way to visit a large bakery equipped with a traveling oven. He wanted to find out about the traveler before signing a check for one, after closely studying a type on exhibit at the Bakers World's Fair on Chicago's Municipal pier.

But he is not mentioned here to tell of this journey and its results. On his way he stopped off to visit the bakery where he worked in his boyhood. There it stood. Still in operation. **NOT A CHANGE.** He could have gone in and picked up the old tools he dropped in his boyhood, and could have gone on with just the same old processes, getting just the same old results.



# Bread and Milk and Vitamins

*Baking Science May Develop Data About the Latter Which Will Startle Students of Nutritional Deficiency*

IN READING, Pennsylvania, a public spirited baker listened with grief in his heart to the reports about undernourished school children in the public schools.

He joined with a committee of people who wanted to give special meals to those lagging behind in the race for sturdy young manhood and womanhood. He offered bread, as some of the diarmen offered milk, and he hoped out of it to win a better fame for bread and milk as a nutritional combination.

But the nutritional nurse employed to supervise the feeding experiments, refused white bread. She had been taking lessons from Prof. McCollum of Johns Hopkins University and was convinced that the bran of wheat carried away with it essential mineral salts, vitamins, and amino acids that were necessary to a life-sustaining food.

The baker supplied whole wheat bread as demanded, but was a little nonplussed. In telling this story here we do so only because it is duplicated in scores of ways all over the country and one of the important questions on which the baking industry seeks new light is this very question of the nutritional consequences of eating whole wheat bread, white bread, bread baked with milk, and bread eaten with milk, after being baked with water.

It would be easy to venture rash guesses as to the consequences in each combination. For instance many "whole wheat cranks" have claimed that whole wheat performed wonders while patent flour bread was "poison." A baker has just sent us a full page advertisement setting up white bread as a "poison food."

It is time bakers knew what the nutritional experts were finding out about bread and milk and bread and meat, and various types of bread served alone.

In the laboratories of the American Institute of Baking experimental animals are undergoing many interesting feeding tests.

One of these tests is with a new kind of bread, made from a formula meant to sustain life more completely than any other known food, including milk. The baking industry will be given this formula after it has been tested out until it is seen that test animals will live upon it in good health, will bear young, and that these in turn will mature and bear young through several generations.

Of the tests already made, those from the laboratories at Yale, at Columbia and at Johns Hopkins University are the most authoritative and interesting in America while those at the Lister Institute are the most interesting in Europe.

An experiment reported in the Journal of Biological Chemistry dealt with several kinds of bread. It was made by Osborne and Mendel.

A loaf in which milk was used for a fluid content, without water, was fed to rats which at the start weighed 200 grams. After 160 days of this ration the rats weighed 340 grams. Some other rats of the same litter were put on a diet of bread made with half-and-half milk and water. Their weight reached only 290 grams, or 50 grams less than that of rats fed on an all-milk loaf.

On bread made with water alone the rats refused to grow appreciably. After 140 days they still weighed under 230

grams, after being started at 215 grams.

Then came an interesting experiment with a feeding mixture of dried white bread and dried milk powder.

ON MILK ALONE RATS GREW LESS RAPIDLY THAN ON BREAD AND MILK. That is while one batch of rats were putting on 80 grams of weight on a milk diet another batch put on 100 grams of weight on a bread and milk diet. It scarcely mattered at all whether two-thirds bread and one-third milk was used or vice-versa. But when five-sixths of the ration was bread and one sixth milk the rats put on only 70 grams of weight, as compared to 100 for those on a more liberal mixture of bread and milk.

On bread alone the rats scarcely gained at all, in forty days.

Still another series of experiments threw new light on the whole-wheat theory. Those who have contended that bread and milk made the ideal diet have always insisted that bossycow got the bran discarded from whole wheat in making patent flour and that bossycow fed this bran's essential foods back to us in much more digestible form.

An experiment in feeding whole wheat bread in a bread and milk combination with this rat group matched against another eating white bread and milk, turned out an interesting result. Both groups shot upwards in weight at practically equal rates.

From sixty grams they increased in 100 days to 260 grams for those eating two-thirds whole wheat bread and one-third milk powder while those eating one-third milk powder and two-thirds patent flour increased from 60 grams to 235 grams. On a diet composed of one-third milk powder and two-thirds starch the rat group only increased in 100 days by 100 grams of added weight. If the milk was greatly reduced and the bread ration greatly increased then the whole-wheat

bread group drew away from the others more rapidly.

And where did meat come in? Some male rats of the same litter were divided into groups when two-thirds grown. One group got bread and butter, another group bread and milk, and still another bread and meat. The bread-and-milk group sped away from all the others in growth results. They increased weight from 130 grams to 320 grams while the bread-and-butter and bread-and-meat groups were each lingering around 200 grams. This was a growth of 70 grams as compared to 190 grams.

Now do all these lessons mean anything in a laboratory owned by the American baking industry?

We know that yeast, sprouted beans, and the germs of cereals are important sources of Vitamin B. We know what effect many foods have upon test animals which are generally considered to duplicate or reflect the living conditions of mankind.

Result? Can our chemists produce a "Superloaf?" A loaf that will meet every criticism of every nutrition expert?

It is well known that Alfred W. McCann of the N. Y. Globe is a bitter assailant of white bread.

He has heard of a "superloaf" being created to become a real "Bread of Life" by one American baker. And instead of further assailing the industry he breaks out in the magazine called "Physical Culture" with a paean of praise for this new bread. He predicts greater things for it than for any food of which the world has known. And he abandons his life-long preachment that whole wheat alone is the solution of our dietary troubles in modern America.

Altogether here lies a field that American bakers will want to watch and to understand as its developments are unfolded for our notice.



# Molds in Bakeries

## *Sources of Infection in the Bakeshop That Reach the Sterile Loaf After It Has Left the Oven*

Continued from the August Baking Technology, pages 230-235. This is the concluding installment of a report on an investigation into mold infection made from the American Institute of Baking under the direction of Dr. Samuel C. Prescott, head of the Department of Biology and Public Health of the Massachusetts Institute of Technology, by J. W. Streider and R. N. McClellan.

In the two previous installments it was shown that flour cannot be responsible for mold as bread "bakes out sterile" whatever the number of mold spores in the flour. In this installment the story of infecting the loaves after baking is told.

Since the baked loaf of bread is sterile, the infection takes place after the bread leaves the oven. The possible sources of infection are:

A. During the process of cooling.

B. Contact with the wrapping paper

A. To determine the extent of infection which take place during the cooling process, samples were collected from the bread racks on which they had been exposed to the air.

Several loaves, which had cooled for varying periods of time, were wrapped as customary. This was done to ascertain how soon after leaving the oven it is safe to wrap the loaf, so that it does not sweat. This latter experiment shows the infection due to the paper as well as that due to infection received during the cooling process.

1. Two loaves—cooled 15 minutes.

One loaf was placed in a sterile glass container; the other was wrapped and placed in a sterile tin container.

2. Same as 1—cooled 20 minutes.

3. Same as 1—cooled 5 minutes.

4. Same as 1—cooled 30 minutes.

Result:

1. Loaf in glass container.

No growth up to seventh day

7th day—appearance of green mold (Penicillium, white Mycelium, no fruiting)

8th day—appearance of green mold (Penicillium, Aspergillus)

9th day—appearance of green mold (Penicillium)

10th day—appearance of green mold (Penicillium)

11th day—appearance of green mold (Penicillium)

12th day—appearance of green mold (Penicillium)

The wrapped loaf in tin container was examined at the end of twelve days.

Appearance:

Abundant mold growth. The types present were Rhizopus and Aspergillus.

Rhizopus was present on this loaf and not on the previous loaf—may have come from paper, not necessarily, however.

2. Same result as obtained in 1, though the infection was slightly heavier.

Wrapped loaf showed Rhizopus in addition to the above types. This loaf showed sweating; thus, 20 minutes is too soon to wrap the loaf after it leaves the oven.

3. Glass container.

No mold growth until the 7th day

7th day—white mycelial (no fruiting structures)

8th day—Aspergillus

10th day—Aspergillus

11th day—Aspergillus

12th day—Maximum growth

Loaf could not be wrapped at end of five minutes. The loaf in this case showed only one type of mold and the growth was small; very much less abundant than in the previous examples.

4. Same result was obtained as in the two preceding cases, except that the loaf showed growth of Rhizopus in addition to Penicillium and Aspergillus. The wrapped loaf in the tin container showed the same types of mold as the unwrapped.

## CONCLUSION:

Loaves become more or less heavily infected with mold spores during the process of cooling. The amount of infection increased as the time of cooling increased.

The types of molds found on the loaves which have been cooled, but not wrapped, were: *Rhizopus*, *Penicillium* and *Aspergillus*. Thirty minutes is the minimum time in which a loaf can be wrapped.

## POSSIBLE SOURCES OF INFECTION OF BREAD DURING COOLING

Several experiments were carried out to determine the extent of infection of the loaf which had cooled and was ready for wrapping. Several samples were also tested to determine the additional infection of those loaves due to wrapping.

1. Two loaves which had cooled 30 minutes were placed in sterile tin containers. They were examined at the end of 12 days so as to allow for maximum growth.

## Appearance—12 days

Exterior of the loaf was entirely covered with mold growth.

## Types—

*Aspergillus* (3)  
*Penicillium*

2. Two loaves had cooled 30 minutes were wrapped and placed in sterile tin containers. These loaves were examined at the end of 12 days.

Sterile Petri dishes containing sterilized dextrose agar media were exposed at various points. This was done to determine the source of infection and to ascertain whether the types found checked with the types found on the bread.

Plates were exposed on the bread racks for the same period of time as the bread is while cooling. They were also exposed on the endless oven belt, wrapping machine belt and the bread handling cloths were tapped over the plates; the plates were placed upright and reversed. After exposure, they were taken to the laboratory and incubated at room temperature.

The molds found by making these plate exposures checked very well with the types found on the bread. Thus—

## Molds appearing—

On bread	On plates (Petri dishes)
<i>Penicillium</i>	<i>Rhizopus</i>
<i>Rhizopus</i>	<i>Penicillium</i>
<i>Aspergillus</i> (2)	<i>Dematium pullulans</i>
	<i>Aspergillus</i> (2)

## CONCLUSION:

The air, endless belts, etc., are infected with mold spores and serve as the sources of infection of the bread during the cooling process. Thus, from the time the bread leaves the oven until it is wrapped it is constantly open to infection.

Whether or not the paper used for wrapping adds to the infection already existing on the bread is now a matter for consideration.

## B. EXAMINATION OF WRAPPING PAPER.

Examination was made of the paper at the bakery to determine the presence of mold spores. Samples were collected from original wrapped rolls and unwrapped and partially used rolls of paper. The paper was collected by means of sterile rubber gloves and placed in sterile copper containers. Small portions of this paper were cut (by means of sterile scissors and forceps) and placed in sterile Petri dishes. Dextrose agar media was added.

Five portions, collected from the wrapped roll, were plated in the method described above, and incubated at room temperature. \* \* \* \* \*

The above experiments showed that the bread wrapping paper is infected with mold spores. The degree of infection seems to vary with different samples of paper; the paper collected from the wrapping machines showing the heaviest infection. The results obtained above would indicate that the air is an important factor



in connection with the infection of the paper, paper which has been longest exposed in contact with the air showing a greater amount of infection. These experiments showed that theoretically the paper contained on its surface mold spores; whether or not these spores would infect the bread and thus cause mold growth thereon was next determined. It must, however, be borne in mind that the molds mentioned are common forms, and that occasionally to find small numbers of these would not be surprising.

2. Two loaves were collected in sterile tin containers immediately upon leaving the oven and were cooled in this manner, thus maintaining their sterility. The loaves were then put through the wrapping machine, after having cooled for a sufficiently long period (30 minutes) and the wrapped loaves were finally placed in sterile tin containers. The loaves were examined at the end of seven days and showed an abundant growth of mold; the only type present was *Aspergillus*. The paper used to wrap the loaves in this experiment had been exposed to the air for a rather long period of time and had thus had ample opportunity to become infected with mold spores from this important source. The above experiment was repeated, using the same conditions except that the paper, which was used to wrap the loaves, was taken from the inside of the roll; thus the paper used in this experiment had less opportunity of becoming infected from the air than did the paper used in the preceding experiment. Two loaves were cooled, using aseptic precautions and were wrapped as above and placed in sterile tin containers. One loaf was examined at the end of seven days and was found to be covered with a potent growth of *Rhizopus* while an incipient growth of *Penicillium* was observed. The second loaf was examined at the end

of fourteen days and was found to be practically sterile; one small colony of *Aspergillus* was found present. These results would seem to indicate that the infection of the paper from the air is rather important and that the paper at no time is absolutely free from mold spores.

3. To follow this matter to the source, a visit was made to the factory in which bread-wrapping paper is made, and a careful examination of the process was conducted.

Bread wrappers are, for the most part, divided into two classes, (a) Dry waxed, and (b) Self-sealing.

#### DRY WAX BREAD WRAPPERS.

Dry wax wrappers are so called because they carry practically no wax on their surface. A relatively small amount of wax is used in their manufacture and this wax is driven into the fabric of the paper without obtaining the shiny surface coating. Wrappers of this type were used on the original Sevigne wrapping machine. The machine is relatively expensive but handles a somewhat cheaper paper and wraps at a much higher rate of speed than do any of the other machines. The seams on this wrapper are closed by means of melted paraffin which is applied during the wrapping process from a small reservoir. This method costs more than the self-sealing, but owing to the fact that the paper is more porous, it is perhaps more satisfactory than the latter, as the self-sealing type retains the moisture and produces an inoculated effect, thus promoting mold growth. The self-sealing type, however, keeps the bread from drying out.

The method of waxing the dry waxed grades is to run the raw paper, which may or may not be printed (all printing is done previous to the waxing process) between a steel and rubber roll on the

wax machines. The steel roll revolves through the molten wax (212° F.) and carries a certain amount upon the paper. The rubber roll which runs against it serves as a squeeze roll and reduces the amount of wax applied. The web of paper is then run over two or more revolving coppered rolls through which live steam circulates. This application of heat after the wax has been applied serves to drive the wax into the paper; the paper is uniformly impregnated. After leaving the coppered rolls the paper is immediately rolled.

The time of exposure of the paper to the air, and thus to infection, from the time it leaves the coppered rolls until it is wrapped, is about three or four seconds. This short interval of time and a similar period when the paper is unrolled, divided lengthwise and rerolled, constitute the sole means of infection. After being rerolled, the paper is wrapped and is ready for shipment.

#### SELF-SEALING BREAD WRAPPERS.

Self-sealing wrappers are those which contain a sufficient amount of wax in the fabric and on the surface so that when they are wrapped about the bread a seal is effected by passing the loaf so wrapped over a hot plate.

The machines which employ this type of wrapper are the Hajssen and Brownell machines. The machines are slower than the Sevigne, described above.

Owing to the fact that bread wrapped with this type of wrapper retains its moisture longer than the bread wrapped in the dry sheet and also because of the shiny appearance of the surface of the paper, many bakers prefer it to the dry.

The method of applying wax on this grade is to draw the raw paper through the molten wax which is carried at a temperature varying from 180°-210° F.

The web is then passed between the steel and rubber rolls as in the case of the dry waxing, which serves to squeeze off the superfluous wax. The paper is then passed over from two to four rolls through which cold water circulates, thus chilling the wax so that the paper can be immediately rolled. The source of infection with this type of paper is the same as with the dry wrap.

From a brief consideration of these processes it is evident that very little infection of the paper is possible in the factory. Samples were collected from the machines treating the paper as the paper was about to be rolled; a sample was also collected from a roll of paper which had been unrolled, divided lengthwise, and rerolled. Petri dishes (containing sterile dextrose agar) were exposed to the air at various points during the process to determine the extent to which the air was infected with mold spores; they were incubated at room temperature.

- |   |             |
|---|-------------|
| 1. Sample collected from the                    | } about to  |
| "dry wrap" machine                              |             |
| 2. Sample collected from the                    | } be rolled |
| "wet wrap" machine                              |             |
| 3. Sample collected from "dry wrap" (re-rolled) |             |

These samples were collected, taking aseptic precautions, and portions were plated in sterile Petri dishes and dextrose agar was added.

*Penicillium* and *Aspergillus* species of mold predominated on all plates; *Rhizopus* was found but rarely and it was not abundant when present.

The plate exposures showed that the air was rather heavily infected with mold spores.

The samples of paper, however, were found to be practically sterile, only now and then a sample showing the presence of fungi. While these results seem not to be in harmony, this discrepancy is ap-



parent rather than real. As a matter of fact the machines run at such speed and the amount of air movement in the mill is so large that there is very little settling of the spores and the infection of the paper at this time is really extremely light. The time of exposure of the paper, as pointed out above, is very limited and so the conclusion may be drawn that the paper as it leaves the factory is practically sterile, though not theoretically so. The amount of infection from the paper mill is extremely small as compared with the infection the paper is exposed to in the more dust-laden atmosphere and machinery of the bakery. Thus, it is convincing that the occurrence of fungi on the paper in the bakery is very largely due to infection actually received at the bakery.

The infection of paper is sporadic, depending on chance; if the spores are present, while the paper is exposed to the air, they will lodge on the paper and infect the bread when it is wrapped.

Paraffin sections of portions of paper from a badly molded loaf, which seemed to show that the mold had grown through the paper, were made. The technique used was as follows:

Sections showing mold on each side of the paper were cut, and the fungus killed in McClenden's fluid. The sections were run through 30%, 70%, 95% and absolute alcohols and then through xylene. Paraffin blocks were made and the cross-sections cut on the microtome about 10 microns in thickness. These sections were fixed on slides after the manner of the usual histologic procedure for paraffin sections and stained with Delafield's haematoxylin and mounted in Canada balsam.

The fibres of paper and mycelia were contrasted by the intensity of the stain, and under the microscope, penetration of the paper by the fungus could be seen.

## CONCLUSIONS:

1. Paper as it arrives at the bakery is practically sterile.
2. The paper becomes infected at the bakery.
3. The mycelia of the mold will penetrate the wrapping paper (dry wax type).
4. The types of mold occurring on wrapping paper are the same as those found on infected bread and in the air, etc.

## PREVENTION OF THE MOLD INFECTION

In attempting to solve the problem of preventing the molding of bread, there are two possible methods of attacks—(a) by handling in such a manner, after it leaves the oven, that its sterility is maintained; this means that aseptic precautions must be observed thus preventing the mold spores from gaining access to the bread; or, (b) by treating the loaf, which has already become infected, so that the mold spores present are unable to develop. The second method of prevention will be discussed first.

B. The problem of treating the loaf of bread, already infected with mold spores, so that the molding will not take place, resolves itself into the following methods of treatment:

1. Heat treatment
2. Chemical treatment
3. Physical treatment
  - a. mechanical coating of loaf
  - b. unfavorable conditions for growth of mold (temperature, moisture, etc.).

Experiments were carried out using the various types of treatment listed above. Since the source of infection, as previously determined, was found to be from the air, etc., during the process of cooling and from the bread wrapping paper, loaves were used for the following experiments,

which were wrapped and were ready for shipment.

1. **HEAT TREATMENT.** Several experiments were carried out to determine the optimum time and temperature for treating the wrapped loaf of bread, so that the growth of mold spores was inhibited. The wrapped loaves were subjected to dry steam in the autoclave and to hot air in the hot air oven; this was done to ascertain which method of treatment is the more efficient. After treatment, the loaves were placed in sterile tin containers, incubated at room temperature, and examined at varying intervals of time. In no case was the interior of the loaf of bread found to show growth of mold.

A. Experiments using autoclave.

Two loaves were exposed to moist air, a temperature of 75° C. for 5 minutes at atmospheric pressure. One loaf was examined at the end of 9 days. The loaf showed the presence of a white mycelial growth with no fruiting structure, showing that the growth was young. There was also found one colony of *Penicillium* mold and a small growth of *Rhizopus*.

The second loaf was examined at the end of 14 days. An abundant growth of mold was present, entirely covering the exterior of the loaf. The types found were *Aspergillus* and *Penicillium*.

b. Two loaves were subjected to a temperature of 110° C. for 30 seconds at 15 pounds pressure. One loaf was examined at the end of 9 days. The exterior of the loaf showed no evidence of mold growth; the loaf was not reduced in its moisture content and was apparently unchanged.

The second loaf was examined at the end of 14 days. An abundant growth of *Rhizopus* and *Aspergillus* mold was present on the exterior of the loaf; the

mold mycelia appeared to penetrate the paper.

c. Two loaves were subjected to live steam for 1 minute at atmospheric pressure. One loaf was examined at the end of 7 days; there was no evidence of mold growth present; the loaf was rather moist, but was not unpleasant.

The second loaf was examined at the end of fourteen days. An obvious growth of mold was present; *Aspergillus* was the only type evident.

4. Two loaves were treated in the same manner as the loaves in (c), except that the time of exposure was increased to 4 minutes. One loaf was examined at the end of 7 days. There was no evidence of mold growth present; the loaf, however, was rather moist and soggy.

The second loaf was examined at the end of 14 days and was found to be practically free from mold, only one small colony of *Aspergillus* being found.

The loaves treated by means of the autoclave were slightly changed in character; they were moist and soggy after treatment, but after standing from 7 to 14 days they assumed a more agreeable appearance and taste.

EXPERIMENTS WITH HOT AIR (DRY HEAT).

a. Two loaves were subjected to a temperature of 85° C. for 5 minutes. One loaf was examined at the end of 9 days. The exterior of the loaf showed a growth of *Aspergillus* and *Penicillium*; the growth was not abundant.

The second loaf was examined at the end of 14 days. A very evident growth of *Aspergillus* and *Penicillium* mold was present.

b. Two loaves were subjected to a temperature of 85° C. for 8 minutes. One loaf was examined at the end of 7 days.



An incipient growth of *Penicillium* and *Aspergillus* was evident. The second loaf was examined at the end of 14 days; a very abundant growth of *Penicillium* and *Aspergillus* mold was present.

c. Two loaves were subjected to a temperature of 100° C. for 10 minutes. The first loaf at the end of 7 days showed no evidences of mold growth and no loss of moisture. The second loaf at the end of 14 days showed the presence of *Aspergillus* and *Penicillium*; the growth was not abundant and was in the early stages.

d. Two loaves were subjected to a temperature of 105° C. for 4 minutes. Both loaves were examined at the end of 12 days. There was present an abundant growth of mold on both loaves; the types present were *Aspergillus* and *Penicillium*.

e. Two loaves were subjected to a temperature of 120° C. for 5 minutes. One loaf, examined at the end of 7 days, showed a growth of *Aspergillus* commencing to fruit, the growth was small. The second loaf, at the end of 14 days, showed the presence of one small colony of *Penicillium*, the growth was very limited.

f. Two loaves were subjected to a temperature of 120° C. for 10 minutes. One loaf at the end of 7 days, showed no evidence of mold growth; there was no loss of moisture. The second loaf, examined at the end of fourteen days, showed the beginning of slight growth of *Penicillium* and *Aspergillus*.

Untreated loaves showed mold growth at the end of six days.

The above experiments show that the dry heat treatment is the more desirable of the two methods attempted from the aesthetic standpoint, as well as from the standpoint of efficiency. The method of treating the wrapped loaf by dry heat, the requiring a higher temperature and the necessity of a longer period of time for treatment, due to the slow rate of

penetration through dry air, seems to change the character of the bread to a less degree than does the autoclave treatment. The results show that the time of molding of bread may be materially postponed by means of treating the wrapped loaf with heat. The growth of mold spores is inhibited and it is possible practically to postpone indefinitely the molding action. This, of course, is neither desirable nor necessary, due to the aging of the product and its limited life. By varying the temperature and time relations it is possible to determine the optimum conditions for the specific case; some bakers may desire the product to keep longer than do others.

In all of these experiments, the type of container used was one made of tin especially designed for the purpose. These containers keep the loaves remarkably fresh; a loaf will keep for from two to three weeks without drying out. Of course, due to the incubating action, optimum conditions are present for mold growth, but if the loaf can be treated so that the growth of the mold is inhibited, it seems that some method might be possible on a commercial scale; a method adapted to use tin containers would keep the loaves in a very satisfactory condition and would prolong the life of the loaf to a marked degree. This is merely of interest in passing as several objections must be overcome before such a process could be applied commercially.

2. CHEMICAL TREATMENT. The search for a chemical which possesses sufficient disinfecting power to destroy mold spores, or inhibit their action, which is not harmful when taken into the body, and which when applied to bread does not change its character, has proved practically in vain. The Pure Food Laws are so carefully drawn and allow for the use of such a limited number of antiseptics for

the preservation of foodstuffs, that this method of preventing mold growth in the loaf seems rather out of the question.

Experiments were performed using formaldehyde. The infected loaves (loaves wrapped and ready for shipment) were sprayed with solutions of varying dilutions of formaldehyde to determine whether or not this disinfectant would prevent mold growth.

a. One loaf was sprayed with a solution (diluted 1:50,000).

b. One loaf was sprayed with a solution (diluted 1:25,000).

c. One loaf was sprayed with a solution (diluted 1:250).

These loaves so treated were placed in sterile tin containers and were examined at the end of seven days.

a. Loaf showed growth of *Penicillium*, *Aspergillus*, and *Rhizopus*.

b. Loaf showed growth of *Penicillium*, *Aspergillus* and *Rhizopus*.

c. Loaf showed growth of *Penicillium*, *Aspergillus* and *Rhizopus*.

The types found on these loaves were the same, as was also the degree of infection, irrespective of the dilution.

Formaldehyde forms a compound with the protein present in bread which cannot be detected, if used in a sufficiently high dilution. The formaldehyde cannot be detected in a dilution of one part in fifty thousand. If this dilution was sufficiently potent to destroy the mold spores or inhibit their growth, the situation would be ideal; the formaldehyde could inhibit the action of the mold and then form an unrecognizable compound (unrecognizable as far as formaldehyde is concerned).

Unfortunately, as the above results bear out, the concentration of formaldehyde necessary to inhibit mold growth is much too high to make possible its use in this case.

An attempt was made to treat the bread wrapping paper with formaldehyde, considering that the moisture given off by the bread would be sufficient to bring the formaldehyde into solution and then inhibit mold growth. The paper was coated with a solution of formaldehyde and the infected loaf was wrapped.

Two portions of paper were treated: One sample was treated with a dilution (sprayed) of 1:50,000, and the other was treated with a dilution of 1:250. Both loaves showed growth of *Rhizopus* and *Aspergillus* at the end of seven days.

One loaf was sprayed with a solution of formaldehyde 1:50,000, and was wrapped with wrapping paper which had been treated with the same dilution of chemical. The loaf was examined at the end of seven days and showed a growth of *Rhizopus* and *Penicillium*.

The chemical treatment of the crust of the loaf or the surface of the paper seems to be out of the question. Even if a chemical could be found or synthesized which would prevent mold development and which was allowed by the Pure Food Laws, it would be necessary that this information appear on the label and this would undoubtedly interfere with the sale of the bread.

3. PHYSICAL TREATMENT. Several experiments were carried out to determine if it might not be possible to treat the loaf of bread with some substance which would form a thin coating over the surface and thus mechanically prevent the molds from developing.

a. Four loaves were coated with a mixture of egg albumin and sugar. The mixture produced a thin, dry, transparent film over the surface of the loaf and added a rather pleasing appearance to the product. (The mixture could be applied either by spray or brush). The loaves so treated were placed in sterile tin con-



tainers and examined at the end of seven days. A potent growth of *Aspergillus* and *Rhizopus* was found on all of the loaves; the loaves used in this experiment were infected with mold.

b. Several loaves were infected with mold (*Penicillium* and *Aspergillus*), were coated with a thin film of paraffin and allowed to remain in this condition for varying periods of time. The molds were found to grow on the surface of the bread despite the film of paraffin. The paraffin serves to retain the moisture of the loaf very efficiently; the loaves examined were not very much dried out at the end of two weeks.

Methods for preventing the growth of mold by mechanical methods have proved fruitless. There remains one other possible method of preventing mold growth and that is by rendering conditions unfavorable for the growth of the molds.

Two loaves, which had been infected with *Penicillium*, *Aspergillus* and *Rhizopus*, were placed in sterile glass containers. One loaf was placed in the ice chest (15.5°C), the other was placed in the 37°C. incubator. The moisture conditions remained practically constant, due to the fact that the containers were tightly sealed, effectually retaining the moisture of the original loaf. The growth of mold on these loaves was observed daily.

15.5°C.—no growth of mold was observed up to the eleventh day.

37°C.—5th day, heavy growth of *Aspergillus*, *Rhizopus* and *Penicillium*.

Low temperatures inhibit mold growth; body temperatures favor growth.

Four loaves were placed in the incubator (not in tin containers). These loaves were examined up to fourteen days. No growth of mold took place. The loaves had lost a large amount of moisture and the crust was hard, thus offering very unfavorable conditions for mold

growth. The moisture of the surroundings is thus more important than the moisture of the bread. Dry air discourages mold growth, as does also air in motion. Growth is proportional to the moisture of the air and the bread. Dry bread in moist places will mold more quickly than moist bread in dry places.

Experiments were carried out exposing molds to reduced amounts of oxygen. The molds do not grow as well under anaerobic conditions but they do not grow—thus the oxygen content is not important.

Two loaves were infected at the center with a culture of *Penicillium* mold and were then coated with a film of paraffin. The loaves showed a very heavy growth of mold at the end of seven days. These loaves were inoculated after they had cooled, therefore, sufficient time had elapsed for the exchange of gases, the oxygen content of the loaf had increased and the carbon dioxide decreased. Though the oxygen content of the loaf did not represent atmospheric conditions, the amount of oxygen was, no doubt, considerable. The point brought out by this experiment is that the prevention of mold growth by decreasing the oxygen supply seems impractical, unless the amount of oxygen is decreased to a very low level. The experiments performed, maintaining cultures of various molds, under anaerobic conditions, tend to bear out this point. It is of no avail to maintain anaerobic conditions for the loaf, as sufficient oxygen to support the mold growth is present in the center of the loaf.

The temperature and moisture relations are important factors in preventing mold growth. Heat treatment of the wrapped loaf promises to be of value. Chemical treatment and mechanical coating of the bread did not bear fruitful results, hence these methods are deemed unsatisfactory for practical application.

A. The second method of preventing mold growth on bread is that of excluding the mold spores from the loaf. Mold spores are ubiquitous wherever the temperature is not so high as to destroy life. These spores are present, as previous experiments have shown, in the air, on the machines, on the walls, etc., of the bakery, in fact, they are everywhere. The most common medium of dispersion is probably the air.

The baked loaf of bread, which is sterile, after leaving the oven is placed on bread cooling racks for about thirty minutes before it is wrapped. The mold spores are ever present to infect the bread during this process, and as stated above, practically every utensil with which the bread comes in contact, is infected. It is necessary, if infection of the bread with mold spores is to be prevented, that some method be devised to protect the bread so that these spores cannot gain access.

One method which might be installed is to make use of a separate room for cooling the bread, which is to go long distances. The air which enters this room should be filtered and rendered sterile, the bread racks should be treated with live steam to destroy mold spores present and the workers should be supplied with sterile uniforms. Of course the room should be disinfected previous to the operation of this method. The baked loaves could be immediately transferred to this room, after leaving the oven, and cooled under aseptic conditions. The wrapping machines could be installed in a similar room. The machines could be rendered free from mold spores by treating them with live steam. Since the paper is infected mainly from the dust-laden air of the bakery, by using these precautions the paper would be practically free from infection. By using these methods of maintaining aseptic conditions of handling the

bread during the cooling and wrapping processes, the source of infection is eliminated. It is, of course, unnecessary to maintain such conditions throughout the bakery; it is merely necessary to separate the cooling and wrapping processes from the general process.

The two methods of preventing the molding of bread which seem to be the most practical and efficient are the heat treatment of the wrapped loaf, not using any precautions to keep the bread from contact with infection during the cooling, and wrapping the loaf maintaining aseptic conditions. Which method of treatment to be the more efficient will naturally depend largely on the expense necessary to carry out the process. No estimates have been made comparing the approximate cost of the two methods. The problem is for the engineer to solve.

#### STUDY OF MOLD TYPES.

At the beginning of this work considerable time was devoted to an endeavor to classify the molds which were found to be present on bread. This was rather superficial at best, and on conferring with authorities and giving consideration to the problem at hand, it was decided that physiological characteristics rather than morphological were to be desired. Consequently the field was limited to the main types and some of the important physiological phases are herewith presented.

*Penicillium*, *Aspergillus*, and *Rhizopus* were found to be constantly present in nearly all cases wherein the molding of bread is involved. No necessity for an identification into species was brought to mind since there is little distinction within the genus, and the characteristics are to a large extent overlapping.

**ANAEROBIC CULTURES.** Using dextrose agar slants as a medium, *Aspergillus*, *Penicillium* and *Rhizopus* were sub-



mitted to anaerobic conditions, using the sodium hydroxide and pyrogallie acid method. They were allowed to incubate at 20° C.

On the second day after anaerobic conditions had been set up, mold growth was exhibited by all tubes. The growth was not strong, abundant or characteristic and fruiting structures appeared with little regularity or not at all. However, the spores do manage to send out mycelia to a small extent without abundant oxygen being present.

The general characteristics of the three main types may be correlated as follows:

*Rhizopus nigricans* (*Mucor stolonifer*)

Occurrence—exterior of loaf when moist, and in flour.

Temperatures—10° C. to 30° C.

Appearance—At first white, becoming gray to black. Mycelia colorless. Is not rapid in growth.

*Aspergillus glaucus*

Occurrence—exterior of loaf and in flour

Temperatures—10° C. and 30° C.

Appearance—At first white, then blue-green to gray-green with a white halo, later grayish, in old cultures gold, due to the formation of perithica. Mycelia colorless to yellow when perithica are present

*Penicillium crustaceum*

Occurrence—exterior of loaf and in flour

Temperatures—10° to 25° C.

Appearance—White to blue-green later gray blue-green or dark gray. Mycelia are colorless. Is least rapid in growth.

The above characteristics are quoted merely as general information and much work that has been done by workers on this phase of the subject is purely scientific. Any standard work on Cryptogamic Botany or on Fungi contains ample data on this subject.

As for the temperatures, above 55° C. no molds exist, the lower limit being about 10° C.

## General Conclusions

1. The amount of mold infection is proportional to the sanitary condition of the bakery and decreases as this condition approaches excellence.

2. The baking process is one of sterilization as far as molds are concerned, the loaf being sterile when it leaves the oven.

3. Preheating of ingredients is not necessary.

4. The maximum temperature at the center of the loaf is 97° C.

5. Mold infection takes place after the bread leaves the oven.

6. Mold growth starts on the exterior and ingresses; a heavy crust being unfavorable to such a growth.

7. Infection is due to air, handling, racks, machines, and paper.

8. The types of molds found consistently on moldy bread are *Aspergillus*, *Penicillium* and *Rhizopus*. Sporadically, *Mucor* and fungi imperfecti have been observed.

9. Moisture in the air and in the substratum are necessary for mold growth, the former being the more important.

10. Clean, cool air and sunlight have an inhibitory action on the growth of molds.

11. Mold infection may be prevented to a large extent by sanitary precautions, such as (1) daily scrubbing of floors, (2) frequent washing of walls and ceilings with antiseptic solutions, (3) filtering and washing of air in cooling and wrapping rooms, (4) use of live steam on machinery and conveyors, racks, etc.

12. The development of mold growth may be postponed by heat treatment of the wrapped loaf; the time of postponement being determined by the time and intensity of the heat treatment.

13. The application to the loaf of mold preventives has met with little success.

14. Wrapping paper is in general infected with mold spores, infection usually being accomplished in the bakery.

15. Certain bacteria may survive baking.

16. The mycelia of molds are capable of penetrating the wrapping paper when moist.

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### *And Now He Knows*

WHEN they are finding out things of the most vital importance to them youngsters often fail totally to realize what their education means. Ten, or perhaps twenty years later, some happening will bring vividly to mind what some lesson back in their school days really meant.

Here is a paragraph from a letter written by one of the first graduates of the American Institute of Baking's school. This particular graduate was one of two brothers who owned a bakery. He left his elder brother in charge and came to school as a preparatory act to assuming the duties of production manager:

"Business is very good and has increased since I came back down here about 50%. So you see I did learn how to make good bread under the guidance of Bill Wamsley. If things keep on as they are going springtime will give me new equipment which will give still better results than I am having now.

"I would like you to answer me one question—do you remember that experiment on lard you made in the experimental bakery one day? It made a very white loaf—much whiter than the other breads made with other lards, although I think your lard was rancid which produced the whitest loaf. I would like to know the name of the brand as I would like to test it out."

This letter should appeal to machinery manufacturers. By putting the most modern machinery into our School of Baking the manufacturers bred in this student a discontent with the old-fashioned machines he found on returning home.

### *Looking Ahead*

I am keenly interested in what goes on in the baking world and it is a fine thing for the National headquarters to have its own bulletin service to inform us. I read Baking Technology carefully and I firmly believe it is destined to become a big factor in the proper development of the baking industry.

E. H. BICKNELL,  
 Pillsbury Flour Mills Co., Detroit Branch.



# Industries and Government

## *How Representatives of Both Can Co-operate*

By H. E. BARNARD

*Secretary and Business Manager, American Bakers Association*

TWENTY years ago many of us were just beginning our work of enforcing pure food laws. At that time we had no federal statute to guide or to help us. Our state laws were just taking form. They were inadequate and often vindictive rather than educational or regulatory. Our armamentarium consisted of the several parts of Bulletin 13 issued by the Department of Agriculture and a copy of Leach's Food Inspection and Analysis.

The separate energies of states and municipalities were fused into a common purpose by the enactment of the Food and Drugs Act in 1906, and from that day pure food legislation and the development of sanitary control of the production and distribution of food stuffs has been largely directed by the splendid organization set up by Dr. Wiley in the Bureau of Chemistry. The work started in those early days has continued without stop and with but occasional checks throughout the years save only for the utter chaos into which technical work of every description was thrown during the period of the World's War.

Out of the regulations imposed by the Food Administration under the stress of war conditions, many of our ideals of proper labeling were for the time abandoned. New manufacturing industries sprung up overnight. Thousands of inexperienced food manufacturers took on the burden of feeding the world. Many of these men were interested only in the possibilities war time conditions offered for large profits. Too many of these men

are still in business, practicing deceits which, prior to the War, we had thought were abandoned forever, and so conditions today in the food industry are, as I see them, less satisfactory in some particulars than they were during the years prior to 1916.

### *The Industrial Chemist*

The official chemist can never hope to keep himself abreast of his colleague in the works laboratory. The very nature of his work brings his activities into function after the manufacturing chemist has completed his studies and translated them into marketable products. The only possibility through which the official chemist may keep abreast of the times is through constant and complete cooperation with the chemist in industry, and so when I bring to you today some suggestions of how the industries may co-operate with officials I assume at the outset that there is none among you who would set up the slightest barrier between the chemist, who is working as an official charged with enforcing laws, and his brother whose daily task is to regulate production in the work shop of industry.

### *Narrow Visioned Sleuths*

The American people may be forever thankful that changing conditions have eliminated from officialdom the narrow visioned sleuths whose whole existence was concerned in the suppression of technical law violations and whose vision never carried him beyond the Babcock test into the dairy where the milk was produced. And as we have grown more tolerant in interpreting and in enforcing

An address before the Association of Dairy Food and Drug Officials, at Kansas City, Mo., October 4, 1922.

food and sanitary legislation we have learned, I believe, that the difference between the official serving the state on the one hand and the manufacturer serving the people on the other is so slight as to be negligible, and we have come to appreciate the need for a complete co-partnership of effort if our work is to be most highly productive.

There is no food law on the statute book which is not directly beneficial to the honest manufacturer. There is no sanitary code which does not offer the producer and distributor of food stuffs helpful assistance in carrying on his industry. We are working on a common ground, for a common purpose, that of seeing to it that the food of the American people is high in quality, produced under sanitary conditions by healthy workmen and honestly sold under adequate labels. That this desire on the part of the state and of the manufacturers may be carried out is the only reason, I take it, for the passage of food and sanitary laws and for the maintenance of departments for enforcing legislation.

### *Research Laboratories*

Is it not an obvious fact, therefore, that every action taken by the manufacturer which will in the slightest degree tend to aid the inspector at his work or the chemist in the laboratory is in the public interest? Is not this the reason why one food industry after another is organizing and establishing its own research laboratories and setting up its own sanitary and ethical codes? And do not these evidences of a real appreciation of responsibility to the consumer presage the dawning of an era when legislation will be based on the desires of industries for constructive guidance rather than on any need for protection by policing, and for punishment for the unscrupulous.

The baking industry has, for example, set up its own sanitary code. This code has met with the heartiest approval by health officials and sanitarians. Your members have given generous evidences of their interest in the plans of the baking industry to set up its own sanitary ideals and to scrutinize the character of its raw materials and the quality of its finished product in its own control laboratories.

The fact that of all the states in the Union but seven have declined to cooperate with the American Institute of Baking and the American Public Health Service in making a survey of the baking industry, and that many health and food departments have rendered us assistance for which we at this time publicly acknowledge our thanks, is, I think, most conclusive evidence that the desire of the bakers of this country to set up and maintain high ideals of sanitation and service find in you a cordial and intelligent appreciation.

### *Sanitary Bakeries*

And on the other hand, how may we best answer your query, how can we help you? In general, the baker will aid you in formulating any sanitary codes which will eliminate the insanitary shop, the unclean and diseased worker, the unintelligent proprietor, the careless and untrained employe. The baking industry, charged as it is with the responsibility for turning every year more than 60,000,000 barrels of flour into the best food for all mankind, has no patience with that part of its industry which in the interest of the public health should seek some livelihood not concerned with food production.

The baker will cooperate with you in wiping out the host of "just as good's"—"substitutes for's"—"imitations of the real thing" which are the vexation of every buyer. There is no need for cheap



materials for the baker, no call for phony flavors, misleading colors, fillers or adulterants.

The American Institute of Baking has devised a plan of certifying the virtue of goods which are true to composition and claims as set forth by manufacturers. In the progress of this work we have found many interesting things,—such as shortenings filled with glycerin and salt; condensed milk low in fat content; gluten flours largely devoid of gluten; malt syrups far below their declared diastatic value; flours excessively high in moisture content (one lot of six samples showing moisture contents in excess of 13.5% in five cases).

### *A Call to Co-operate*

Our work cannot, of course, produce all the results we hope for unless your departments find it possible to check up and punish flagrant violations. We urge such action; we offer our assistance in any movement which will insure the baker a better quality of raw materials, or the consumer a better bread made of better ingredients, under ideal sanitary conditions.

The day may come when we shall have our own corps of inspectors and investigators, just as we have our own chemical and research laboratories. But until that time may we not hope for the cooperation of your organizations? We want to use the inspector, whose salary we pay, not as a trouble hunter but as an assistant in building up our great industry to even higher levels of service. And we want to make the welcome sign over our doorway so honest in its every letter that it will be a pleasure instead of a mere job for you to come into the modern bakery.

Much legislation is contemplated this coming winter. Some of it may affect the baking industry. May I assure you now that any measure, no matter how

drastic it may be, which is necessary for the better regulation of the baking industry—or which will help in the production of better bread, will have our earnest support. If there are any differences of opinion between us we shall always be content to accept the truth as our guide to the final decision.

And may we not hope that you will come to the Institute whenever you want basic facts concerning the baker and his products. Our doors are open to you, our laboratories will study your problems, our School will teach your ideals. And may I, on behalf of the baking industry, say that the American Bakers Association is behind you in your work for pure food, for honest labeling, for sanitary shops, for clean and healthy workmen, for every ideal which will serve to bring to the table of the great American family a better food supply.

### *An Editor's View*

HARRISON E. HOWE, editor of the *Journal of Industrial and Engineering Chemistry*, is author of an article in "The Nation's Business" for September, that any forward-looking baker can well afford to read. Howe deals with chemists who have put on overalls and gone into the work of serving Industry instead of writing a confusion of words for strictly professional magazines.

He tells how Science has gone to work for the common good since the war brought CHEMISTRY to the front.

His story runs through the work of the fruit growing exchanges, the fertilizer associations, the National Cannery Association, and about 200 other trade associations that found they had much to learn from research work. Then he turns to bread.

It was hardly to be thought, he suggests, that so ancient a craft as bread baking still had something to learn from

Science. But he points out that the American Bakers Association was composed of members who believed that the better loaf was a possibility. He then tells how these men formed the American Institute of Baking, and established it as Home for the Baking Industry where research service work, and a School of Baking went on side by side. He predicts a great future for the research being done here.

Without boasting, we may safely assert that his expectations will be fully realized. Researches begun only last January are still to be completed but their promise is by no means insignificant or without great worth. We believe that the forthcoming numbers of this magazine will contain data that no baker will want to be without.

### *An End to Home Baking*

WINIFRED STUART GIBBS is one of the women with a newer outlook on American life and a newer outlook on the role that bread is to play in modern housekeeping.

"In the old days" she writes in the American Food Journal, "there was some excuse for women when they insisted on wearing themselves out over their bread making. The standards of the baking industry had not been formulated and there was danger of receiving bread that was baked under unsanitary conditions. Then, too, the methods of manufacture had not been perfected, so that the food value of baker's bread did not always measure up to that of home-made. But that is all changed. The bakers have organized their work on a scientific basis, so that at present one can buy baker's bread that is wholesome and palatable and even more digestible than a good deal of home-made bread, because the machinery used in the bakeries is so perfected that the

kneading is more skilfully done than is possible by hand, even with a mixer.

"Of course, I don't mean to be extreme about anything. If conditions are right, by all means let us have home-made bread occasionally. But the chances are that for the given amount of time, effort and fuel we can get more satisfactory results from buying our bread."

Any foolish newspaper editor who tries to start a drive in favor of home baking should receive this article, clipped from this magazine and sent with a letter from his home-town baker. It contains an idea that men writers as well as women home makers need to know about.

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### *Does Sanitation Pay?*

A Committee on Indignation, of a Housewives Association, came to a baker in New York whose plant was the last word in modern sanitary cleanliness. They demanded a reduction in price. He took them through the bakery and told them, yes, he could get cheaper labor—the cheapest in the city, but he showed them the health examination records of those he had. He showed them the cost of upkeep of the plant that only gave a GUARANTEE OF CLEANLINESS to his bread. The women went away—STRONG CONVERTS TO QUALITY BREAD, and they were immune to pleas thereafter of the cheapest loaves. Instead they want to know WHERE such loaves were baked, what was the SANITARY CONTROL, and what the ingredients were. And this story will be repeated all over the country when bakers RISE TO THEIR OPPORTUNITIES. That is why the Jay Burns vision will one day be fulfilled in fellowship, long after it is forgotten as a sort of "bugaboo" on which to assail a so-called big baker with all the "nightmare forebodings" a little baker could have towards him.



## Books for the Baking Laboratory

THE DIASTATIC ENZYMES OF WHEAT FLOUR AND THEIR RELATION TO FLOUR STRENGTH. By Dr. L. A. Rumsey, American Institute of Baking, Bulletin 8. August, 1922. 86 pages.

FLOUR STRENGTH AS INFLUENCED BY THE ADDITION OF DIASTATIC FERMENTS. By Dr. F. A. Collatz, American Institute of Baking, Bulletin 9, August, 1922. 74 pages.

These two contributions to the newer knowledge of flour strength were made as the result of a suggestion by Dr. Ross Aiken Gortner, head of the Division of Agricultural Biochemistry of the University of Minnesota, and Dr. Clyde H. Bailey, associate agricultural biochemist of the same institution. The work was done in co-operation with the American Institute of Baking. When submitted to leading authorities of the American Chemical Society their opinion was unanimously expressed that the work "was scientific; gave a new view-point on flour strength; and opened up new suggestions."

Both papers were submitted as theses in partial fulfillment of the requirement for the degree of Doctor of Philosophy.

The first bulletin, number 8, deals with the enzymes of the different bakers' flours and the way in which they affect baking strength. The second bulletin, number 9, is concerned chiefly with the effects and the control of enzymes which are added as malt to improve the strength of wheat flours.

The ultimate aim of more than a hundred years of research on flour strength has been to determine by a simple laboratory or shop test the true baking value of a flour.

Every grain of wheat, as well as the flour milled therefrom, is a reflection of every biological factor which operated during its growth and maturity. Realizing therefore that not one, but many factors entered into the problem of strength, many investigators have studied one factor after another. Summaries of such studies are given briefly as introductions to these bulletins.

Enzymes, the real agents in actual fermentation, it turns out, were left for critical study until more recent advances in biochemical sciences made new methods available. The University of Minnesota became a leader in developing new methods of biochemical research.

Thorough historical reviews of all work previously done which has a bearing on the problem

of diastatic enzymes precede the experimental data, and the various aspects of the practical problems involved are discussed at some length.

Fourteen authentic samples of wheat flours from the eight typical wheat growing regions of North America were used as the basis for these investigations. The relative baking strengths of these flours were determined by the regular American Institute of Baking standards.

In order to determine how diastatic enzymes act in doughs, it was necessary to develop methods of measurement whereby they could react on natural materials and under conditions such as obtained in baking practice, instead of the artificial substrates usually used.

It was found that average doughs contain almost enough water to permit diastase to work at maximum speed, but that the temperature of fermentation is the most important factor in the control of their activity.

The effects of time, temperature, and acidity of the doughs on diastatic action are shown graphically by curves and charts, and the true function of these enzymes are verified by actual baking tests. The control of acidity in the doughs and the stabilizing effect of the buffer salts, in the flours are discussed.

With the exception of very low grade flours the samples studied show diastatic powers which are a fairly good index of their fermentation characteristics, especially with reference to their behavior in the proof, oven spring, volume and texture.

Bulletin 9 further demonstrates the importance of properly controlled enzymic action by improving certain of the weaker flours with added diastatic malt. One especially valuable contribution of the latter bulletin is the measurement of the protein-degrading enzymes of some malt products and the evidence that these proteolytic enzymes play an important part in breaking down the gluten. The limits within which the percent of malts can be used, due to their proteolytic action, and the balance between diastatic and proteolytic action of these materials are facts which the baker as well as the malt manufacturer must know more about. The relation of diastatic activity to gas production, and the progressive increase of acidity as dough fermentation proceeds are likewise of interest.

These two contributions add materially to our knowledge of what dough fermentation means and how these factors in flour strength, the enzymes, are controlled.

Both publications will be sent to any baker, miller, or chemist who writes that he would like a copy.

## Abstracts of Technical Articles

Selected from *Chemical Abstracts*, because of their special interest to members of the Baking Industry

**Experiment on Suggested Method for Determination of Gluten by Dissolving in Acetic Acid.** S. J. Lawellin. "J. Am. Assoc. Cereal Chem." 5, No. 1, 9-16 (1920). The method of Marchadier and Goujon after modification for the determination of gluten (gliadin and glutenin) based on the solubility of gluten in glacial AcOH was studied. The method is inaccurate as it will not extract total protein of gluten from flour nor extract them pure. It is of no value in routine work, being also disagreeable, lengthy and tedious. The results obtained indicate that a quantitative separation of proteins of flour from each other can be made by extracting with glacial AcOH and the accuracy has been fairly well established but no attempt has been made to isolate or identify the separated proteins. No definite amount of solids, proteins or class of proteins of flour is soluble in glacial AcOH and as a reagent in the determination of gluten, definite protein or class of protein it is of no use. H. A. Lepper.

**Dried Milk as a Food.** R. J. Blackham. J. Roy. "Sanitary Inst." 41, 84-94 (1921). There are five varieties of dried milk on the market. (1) Dried evaporated milk, containing an average of 1% fat, (2) dried half-cream milk, averaging 15% fat, (3) dried three-quarter cream milk, containing about 20% fat, (4) "Government" standard dried milk, corresponding to the 3% standard of the Board of Agriculture and Fisheries, (5) full cream milk made from whole fresh milk, which averages 27% fat. 95-96% is a high degree of solubility to obtain in any dried milk. The effects of drying on milk constituents are: Fats are no longer in emulsion, but in a condition resembling butter and quite granular. When mixed with water the fat globules are con-

siderably fewer and much larger than in fresh milk. Albumin and globulin are coagulated, but caseinogen is not. The protein content is more digestible than in fresh milk. The milk sugar is unchanged. Ferments are all destroyed but Lane-Claypon has shown that this loss is of no importance as regards the value of dried milk for hand-feeding of infants. Fat-soluble A is not affected by heat. Water-soluble B stands desiccation. Water-soluble C, is largely diminished in the preparation of dried milk (according to experts at the Lister Inst., Hess, Fisk, Unger and others demonstrate that there is no diminution of this factor). The literature shows that the fact that milk has been heated does not rob it of its power to convey the tubercle bacillus. Tests of a dozen samples showed neither pathogenic bacteria nor any organisms of the coli group. The only organism isolated was the harmless *Bacillus subtilis*. The use of dried milk as an infant's food, also as a food for adults and invalids, is discussed. Nathan Van Patten.

**Report on Cereal Foods.** C. H. Bailey. J. Assoc. Official Agr. Chem. 5, 241-5 (1922).—The report is a summary of data submitted by the Am. Inst. Baking on check analyses of 3 samples of flour. Detns. of H<sub>2</sub>O, ash, crude protein and crude gluten were made by 28 chemists. The results emphasize the desirability of eliminating the air oven in favor of the vacuum oven for the detn. of H<sub>2</sub>O. Higher ash results were obtained when Ca acetate was used. Wide variations in the protein detns. occurred probably due to errors in standardizing the acid used and other causes. The variations in the results of the detns. of crude gluten were more than in the case of protein owing to the character of the method. Dorothy B. Scott.

**Baking Aids of Mineral Origin.** W. Weinmann. Z. ges. Getreidew. 13, 137-41 (1921); cf. C. A. 16, 1282.—The effect of HBr and HI and their salts and of bromate and iodate when used in baking was studied. A specific effect on fermentation and thereby on the volume and pore form of the product was found with HBr, HI, KBrO<sub>3</sub>, KIO<sub>3</sub>. The doughs are firmer, rise more quickly, round out in fermenting and rise well in the oven. Vol. is increased while pore form and color of crumb are favorably influenced. Similar influences were not noticed with KCIO<sub>3</sub>, KCIO<sub>4</sub> and K persulfate. H. A. Lepper.



### *Why Doctors Err and Also Some Bakers*

A WRITER on dough room problems recently declared that the baker must solve all the sanitary problems that confront a hospital, and all the refrigeration problems that confront a cold-storage expert.

He meant, of course, that micro-organisms, which were discovered in bread-stuffs, in the form of yeast, before they were discovered anywhere else in the world, work best under carefully controlled temperature conditions.

The baker, in other words, shoves his thermometer into his dough batch for a reason somewhat similar to that which causes a surgeon to use a thermometer. Both want to control activities of one form or another of the micro-organisms that play such a vastly important role in human affairs. Ours of course, in yeast, make carbon dioxide and alcohol; theirs make fevers and human ills.

And what if the thermometer is off?

Bakers will be interested in this news item concerning doctors' thermometers which recently emanated from the New York Board of Health:

"Of twelve hundred clinical thermometers landed recently in New York from Europe, the New York Board of Health reports that 90 per cent, or one thousand and eighty, were found defective, all these disclosing some serious irregularity that made their use a menace to the life of the doctor's patient and to the doctor's professional prestige. All clinical thermometers found defective by the New York Board are confiscated and destroyed—they can then do no harm.

"But New York tests only those thermometers offered for sale in that city. Importers are shipping them without inspection into cities and states where there

is no specific law on the subject. Physicians who buy and use these thermometers may have trouble—look out.

"Health authorities everywhere should and must be invested with authority to test and certify to the accuracy of the clinical thermometers sold to physicians in their community. With such protective legislation, a physician will be reasonably sure that the clinical thermometer he buys will be accurate."

In the baking industry some of the biggest plants are testing all thermometers in their own laboratories and allowing branch managers to replace broken thermometers only from their own laboratory stock room.

### *English Progress—and Ours*

IN England the bakers do not seem to be split apart by the bugaboo worship that does so much harm in various sections of America. Their weekly journal is published for ALL and goes to all, and is gladly welcomed from one end of the industry to the other. It carries to them official and semi-official publications from the Government affecting the baking trade; prints scientific articles as fast as new data is developed in the research laboratories; provides an open forum for the interchange of ideas in every part of the country; and ties in carefully the local associations with their National.

They hope there to build a National headquarters similar to the American Institute of Baking. Already, without such a headquarters, they have in their School of Baking 50 day students and 100 evening students. And they send out free lecturers where there is any demand "in London and the Provinces." Here is an example of "pulling together" that ought to make us "stop, look and listen" to the problem of the foolish tales that do so much harm here.

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association.*

Vol. I

CHICAGO, ILLINOIS, NOVEMBER 15th, 1922

No. 11

## Keeping the Bread Line Open

IF modern baking owes anything to the modern world, it is the duty of distributing the modern loaf, and its attractive cousin, the modern package of bakers' cake, as far into the rural districts as possible.

The city woman, who perhaps has her profession, or her club, to take up her time, is well served by either wholesale or neighborhood bakeries. But there are large, sparsely settled sections of the country where no woman can save herself from drudgery by saying to her grocer, "a loaf of bakers' bread, please."

That is unless express companies bring the bread in from the nearest big cities.

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For this reason the American Bakers Association has been keenly interested in every move of the express companies to make it harder, through rate increases, to send out express shipments of bread.

The express rate committee of the Association has just sent out petitions to the railroad commissions of twelve different states. These commissions have charge of rates for express shipments

within their various states.

As a result of these petitions cake and bread shipments are still going forward, without an added express rate burden, that otherwise would now be enforced.



The result, of course, would be to shrink up the zones in which shipments of bread and cake could be successfully made.

The necessity to send out these petitions is a good indication of the manner in which ORGANIZED WATCHFULNESS must be enforced, in order to keep the world moving aright instead of awry for the baker.

The law, of course, is a mechanical thing, except as leavened with the spirit of life. In this case a mere mechanical condition was on the point of gaining such power that it would cost our bakers thousands of dollars, or prevent thousands of people from obtaining bakers' bread.

### *Action In Washington*

The trouble started when the Interstate Commerce Commission received, last Spring, a notice from the express companies that they proposed to make a big increase in the express rates on cake. And also proposed a big increase in the express rates for boxes containing both bread and cake.

This was done on the theory that cake, although it is made of such prime-quality foods as flour, eggs, sugar and milk, is a "luxury."

The American Bakers Association, through its express rate committee, filed a protest and its committee chairman, with its counsel, E. H. Hickock, went to Washington to present the bakers' side. They convinced a sub-committee of the Interstate Commerce Commission that cake was indeed a food and the fact that it was tasty did not militate against its food value.

### *Rate Increase Suspended*

They obtained a suspension of the express companies' proposed rate increase, in so far as the Interstate Commerce Com-

mission had jurisdiction. But the express companies had also filed their notice with a great many state commissions, to be applied to shipments wholly within these states.

To obtain express rates that would be fair both to shippers within states and those whose shipments crossed state lines, it was necessary to send petitions to each of these state commissions. This work was done at the National home of the baking industry.

Suspensions were obtained but these suspensions were for a definite period. In most cases this definite period came to an end on Nov. 12.

On that date, if no other action had been taken, the raise in rates proposed by the express companies would have automatically gone into effect. Thus shippers within state lines would have been penalized over those whose shipments crossed state lines.

### *State Complications*

As for the Interstate Commerce Commission it was still holding under advisement the general rate situation. To meet this failure of two sets of governmental regulatory bodies to function in unison it became necessary for our express rate committee to petition all American state commissions to make new rulings further suspending express rate raises within states.

Attorney Hickock prepared petitions which were sent to the Railroad Commission of Georgia, the Commerce Commission of Illinois, the Public Service Commission of Indiana, the Public Service Commission of Maryland, the Department of Public Utilities of Massachusetts, the Public Utilities Commission of Michigan, the Public Service Commission of Missouri, the Board of Public Utility Commission-

ers of New Jersey, the Public Service Commission of New York, the Public Utilities Commission of Ohio, the Public Service Commission of Pennsylvania, and the State Corporation Commission of Virginia.

And the result from sending these petitions was immediately "registered" on the baking world. Georgia responded in a typical manner by providing that prevailing rates should NOT BE INCREASED until proceedings before the Interstate Commerce Commission "have been disposed of."

Thus ORGANIZED WATCHFULNESS has saved the baking industry from this complicated situation, as it may ultimately save it from any increase in express rates whatever.

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### *A Complete Food*

WHEN somebody comes up to you in an excited way and tells you "white bread kills rats" tell him right back that white bread plus a generous spreading of good fresh butter and a glass of good fresh milk, makes a "complete food," and does not kill any animal whatsoever that lives on it.

"White bread kills rats" in precisely the way that milk from winter-fed cows, if used alone, would kill them, or meat from pigs, or beefsteak, or pears, or apples, would kill them. Or even lettuce leaves, or raisins.

In fact you can take any and every American foodstuff and alone it will call for something else to sustain life. Even the cow that produces milk, and the soil that produces the wheat grain call for "something else" than the grasses of the fields and the minerals and humus of the soil. The cow calls for her "bran

mash" to make a rich milk; the soil calls for fertilizers rich in the minerals that previous wheat crops have mined from the soil. Hold fertilizer back from the soil and you'll get no fit wheat, except from virgin soil.

We hear a great deal about vitamins without which test animals die in spite of full stomachs, filled with vitaminless fats, proteins and carbohydrates. By the same tokens the same rats will surely die if fed on vitamin extracts alone, no matter how rich these may be. You might as well say "gasoline kills automobiles," as to say "white bread kills rats." Gasoline kills automobiles, as many a driver knows, until battery spark and air-mix are added, and then gasoline runs automobiles, and if the driver is lucky "she hits on all six."

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### *The New Vitamin Loaf*

THE representatives of the great universities concerned, already doing pioneer research work in the food value of mineral salts and proteins, organized a thorough plan of investigation of the Ward laboratory experiment. Thousands of pigeons, rats, mice and guinea pigs were fed, observed and weighed during the tests of comparative nutritive strength between the bread containing the extracted vitamins, perfected proteins and mineral nutrients and ordinary white bread—both commercial and home-made. The animals fed on the vitamin bread and water thrived, attained their full growth and maturity, and bred even to the fourth and fifth generation. Those animals fed solely on ordinary white bread and water died from lack of the essential elements.

—From the New York Tribune.



# A Nutrition Expert on Bread

*Prof. H. C. Sherman of Columbia University Tells the American Public Health Association About Bread Vitamins*

NO MATTER what the baking industry thinks about it the public health officials all over the country are rising to revise their opinions of nutritional value to conform to "The Newer Knowledge of Nutrition" as developed by physiological chemists. In England members of the medical profession itself are doing exactly the work that the chemists are doing here while they complain of a lack of cooperation and support from the "men of the clinics," as they style the members of the medical profession.

Public Health officials at Cleveland heard Prof. Harry C. Sherman of Columbia tell of the latest authentic developments in Vitamin Science. Some of it had to do with bread. We reprint it because bakers, if they are informed of these opinions held by scientists, will be better able to meet arguments which otherwise they would not know the source of.

Prof. Sherman told of the experiments with Vitamins A, B, and C, as found respectively in fats, growing green food, and milk, and in fruit juices. He told of curing cases of scurvy and beriberi by changes in diet to eliminate some vitamin deficiency, and of other diseases that may yet be cured by further laboratory experiments.

Simultaneously with Prof. Sherman's address, the Ward Baking Co., announced its success in experimenting with a new loaf of bread, meant to be a complete food. This new loaf was built in connection with the most careful biological chemists at work in the vitamin field. A new plant was built to extract from various sources the organic salts and vitamins

for lack of which test animals fail to thrive on ordinary bread.

While it was building rumors styled it "a new yeast factory" but its real purpose in connection with the new "super-loaf" is now made known.

Prof. Sherman speaking of the vitamin content of breads had this to say:

A liberal allowance of fat-soluble vitamin certainly tends toward a higher degree of health and vigor; and when more is consumed than is needed at the time, the body has power to store the surplus and hold it available for future use. This has been found to be strikingly true both of young animals and of adults.

An animal taken at weaning time from a family whose diet is relatively poor in this vitamin and placed upon a diet which lacks it, but is good in all other respects, will very soon cease to grow; whereas one of the same age but from a family whose diet furnished liberal amounts of fat-soluble vitamin will, upon the same experimental diet, continue to grow by virtue of his stored vitamin, often doubling and sometimes trebling his weight. Similarly the length of time that an adult can survive on a diet lacking the fat-soluble vitamin has been found to depend upon the opportunity which he has to store the vitamin in his body from surplus received in his previous food.

In experiments now approaching completion in the laboratory of food chemistry at Columbia University it has been found that a mixture of two-thirds whole wheat and one-third skimmed milk powder supplies enough fat-soluble vitamin to maintain growth at practically the normal average rate and apparent good general

health in the rat, and that an increase of the fat-soluble vitamin in the diet by the use of whole milk powder instead of skimmed results in a distinctly higher degree of health and vigor as shown in longer life and much better success in bearing and rearing young. That this is due to the increased intake of fat-soluble vitamin and not of the fat itself is shown by parallel experiments in which the same differences were found to result from diets which differed only in that one contained lard or cocoanut oil while the other contained butterfat.

Recent experiments emphasize strongly the fact that fat-soluble vitamin is needed by adults as well as during growth. That adults appear less dependent upon the fat-soluble vitamin content of their food is attributable in part to the fact that they have passed the stage of development at which the effect of a deficiency becomes apparent quickly, and in part to the fact that when the adult has grown up on a diet rich in this vitamin he will have acquired a sufficient store to carry him over subsequent periods of inadequate intake, provided these are not too prolonged.

How the fat-soluble vitamin which the body has stored is distributed among the different organs and tissues has not yet been determined quantitatively. Weight for weight liver contains more than muscle or adipose tissue; but the concentration of fat-soluble vitamin in liver, in muscle, or in adipose tissue will depend primarily upon the concentration of this vitamin in the food which the animal had received. Thus the vitamin value of meat of the same kind cannot be foretold even for closely related animals of the same species, except as we know also the food which they have received and the rate at which they have been fattened.

Prof. Sherman spoke very highly of milk as a food rich in vitamins, and of bread made with milk—even up to the full of the liquid portion of the mix. Such bread, whether whole wheat or white bread, has been found much closer to a complete food than water mixed bread, both whole wheat and white.

---

### *Want Bread Exhibit*

MY CLASS, the fourth grade at the Roosevelt School," writes Miss Ruth Lund to the Royal Baking Co. of Salt Lake City, Utah, "is making a study of the development of our state from the beginning to the present time. If you have any literature or samples of the baking industry that will help us, we would be glad to have you send them to us for our work this year and also to keep in our school library."

The Royal Baking Co. referred the letter to the National home of this industry. And a neat little exhibit of the baking industry's growth will go forward in a short time. That is a service we hope to perform in thousands of schools where the world's chief foodstuff must be studied from now on in connection with one of the world's chief industries.

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### *John Ritter at Work*

JOHN RITTER of New Albany, Indiana, came to our Baking School and went home again, to work in the baking industry.

"Since I came back business has increased wonderfully" he writes, "and my course at the American Institute has brought this success. I have a greater insight into bread making than I had before."

This is the kind of a letter that brings a glow of pride to all who in any way helped to found this Institute.



### *Chain Stores Again*

IF chain stores should suddenly determine to become members of the American Bakers Association and work with its membership to eliminate the use of bread as a "leader" to be sold below cost, how many retail, wholesale, and "syndicate" bakers would feel happy over their membership? We would imagine the number might be few.

It has been hard to teach bakers that it is all right to fight over the things they compete about, and at the same time all wrong to carry the spirit of competition to the point of refusing to unite for the things that all can win by joint action alone.

The good will for bread, that will carry it into the 50 per cent of American homes where mothers are still to be rescued from kitchen drudgery, can be formed only by united action of neighborhood bakers, small wholesalers, shippers, chain store bakers and syndicate bakers. Many letters come in complaining of havoc wrought by sales below cost by chain stores. And some chain store leaders call at our National home to say that they see the wrong of this and would like to see it ended.

"The only answer of the baking industry," says a report to the Indiana association's membership, "to chain store competition should be a QUALITY loaf that will make bread consumers see the difference. It is bound to win out in the end."

It is. And enlightened leadership within the chain store organizations may make this victory more complete even than perhaps competing bakers can dare to hope for. As an element in the bread stuffs industry the chain store group belong within our organized ranks, working for the industry's weal, not its woe.

### *Flour Buyers Helped*

THE United States government has to buy much flour for the army. To train flour buyers so that they will know what they are buying and how to buy it, the government maintains a Subsistence School at 1819 West Pershing Road, Chicago, where real progress in the art of flour buying is being made.

Its assistant commandant, Robert M. Littlejohn, visited the National home of the baking industry to inspect its research laboratories and its Service department, as well as its school. He watched the processes carried on in each department and later returned with many of his associates.

They carried away every bit of the Literature of Bread our library shelves could furnish them, and later were supplied with a complete file of Baking Technology. From the Service Laboratories they adopted a baking test for flour and our standard system for testing flour.

"The members of the faculty of this school enjoy reading your paper and obtain considerable information which is of great benefit to them in teaching the students of this school how to buy flour for the Army," writes Major Littlejohn.

A flour salesman for the Sperry Flour Mills in Ogden, Utah, writes that he constantly meets problems in attempting to sell flour which he could handle much better if he knew the baking end. He has subscribed to our magazine. It is printed in the hope that it will prove as beneficial to flour men as to any other group within the breadstuffs industry. Ten readers for every one it now has is the only way it will become a real broadcasting station for what all within the Breadstuffs World should know in common.

## *Victory at Washington in Express Rate Fight*

Telegram

New York, Nov. 15, 1922.

Dr. H. E. Barnard, Manager American  
Bakers Assn., Chicago, Ill.

Interstate Commerce Commission has decided cake express rate case our favor by cancellation of express companies' advance rate schedules formerly temporarily suspended to December 13. This is a 100 per cent unqualified victory for us and should close matter for long time to come.

R. D. WARD,

Chairman Special Express Committee.

The victory bulletined in the above telegram arrived at the National home of the baking industry, when half of the present number of *Baking Technology* was through the printing presses, and it is here recorded in the only available place. Readers of this bulletin are advised to turn back to the first page of this number and to there familiarize themselves with the issues involved. This victory affects deeply all users of bakery products especially those in sparsely settled, rural districts. It comes as a result of one of the major battles for all Bakerydom, staged by those who have so far carried the burden of making ours an organized industry.

## *A Fine Article*

William H. Schafer sends us a fine article on bread published where the housewives of Cincinnati will get the most good out of reading it—in one of the big papers of that city.

"The Cincinnati Post came and asked for it," he writes, "and I furnished it to them. The fact that they printed it proves, I think, that the industry, organized, gets recognition."

## *A Remarkable Letter*

How many of the bugaboos that haunt our dreams ever come true? In the baking industry there is the bugaboo about the "system bakery" that little bakers fear is to swallow them whole.

Yet there were never so many small bakeries in the country as now and the "saturation" point for the sale of baker's bread is still far, far, away.

When men in any industry seek to organize to handle their common problems, there are bitter competing feuds of the older regime to be ironed out. In our industry there was the case of Win Campbell which was immediately erected into one of those horrendous "bugaboos."

The passing of time has brought clearer understanding and a better judgment all around. The writer went to Kansas City immediately after the Campbell move into the twin-loaf field created such a furore in the industry.

I found that the era was one of falling flour prices and that "shoestring" bakeries were springing up like mushrooms. The city politicians had prepared a drive against bakers similar to that in Salt Lake City and Tiffin, Ohio, where the industry was heavily assailed by public officials.

By his twin loaf move Win Campbell cleaned up the "shoestring" situation before any of them got enough of a footing in the industry to care to carry on. A rising flour market helped, of course, to make this growth a very temporary one. The politicians had their campaign tapped on them and their high tension wires were cut before they got under way, even.

With the industry anger and heat soon gave way to pleasanter relations. A comprehension of the facts became general. I wrote to Win Campbell. In his reply in which he demonstrated that he



was seeing straight in the very middle of the hurricane of fury that swept quickly past. Was ever a better tribute paid to the principles behind the organizing American breadstuffs industry?

My Dear Mr. Russell:

How true it is that men are simply children grown up. The fear of the "Boogey Man" hidden in the dark travels with us through life, magnifying our imaginary fears. Our greatest worry usually concerns things that never happen.

The narrative of your recent experiences is truly a page in the history of the baking industry; a page which has been written time and again in the past, but which must disappear in the future if the Industry is to come into its own.

Reviewing the names of the men who have helped to make the history of the baking business, many of whom are to-day actively engaged in the business, one must be impressed not merely with their ability, but with their lofty ideas and their honesty of purpose, which has actuated them in their work.

As an industry we are going forward every day and the hand of petty politics and the voice of uninformed gossip play a lesser and lesser part. Personally I feel we have in the American Institute of Baking, built a foundation which the Industry can construct for the future, an organization of real enduring merit. Upon those directly in charge depends the character of this new and greater Association.

Suspicion, selfishness, and personal aggrandizement must give way to confidence, unselfishness and advancement of the whole.

My belief in my fellow men, strengthened by my own clear conscience, fills me with optimism and confidence for the future. I cannot permit myself to be swayed or troubled by the petty things that have happened in the past, nor those which may occur in the future, because that which we are all working for is too big and too vital to the entire people of our country.

Yours most cordially,  
WIN M. CAMPBELL.

### *Dye Users Arrested*

HERE is a story for every cake baker, who ever used a bit of coal tar dye in his cake to simulate the rich yellow of

a fresh egg. It is a story of arrests and fines—and we hope of repentance and a decision to go to Nature's foods for food material.

"Sixty three Philadelphia bakers are found guilty" headlines the Philadelphia North American. It tells how each of the sixty three were fined \$60 in addition to costs, and then reads them this lecture, in words quoted from Dr. Chas. H. La Wall, chemist of the state dairy and food commission.

"This is a clear case of fraud upon the public and a clear violation of the law which strictly prohibits the use of any coloring matter to make it appear that a food substance has been utilized. The coal-tar dye is not harmful, but it has absolutely no food value and by using it the bakers cheat the consumers out of the high nutrition that is derived from eggs."

To the statement of Dr. La Wall, an interesting bit of comment was added by Agent Simmers, who obtained evidence against the coal tar dye users.

"The practise is by no means broken up," he said, "and we are going to keep after it until the bakers find it is more economical to buy eggs than to pay the magistrate."

"While I was getting evidence I found that the proprietors of bakeries were not the only culprits. One proprietor wanted to drive me out of his bakery when I notified him to appear in court. But I later became convinced that he was the victim of his journeyman."

"The proprietor had purchased the eggs and believed they were being used. Instead the journeyman purchased a gallon of coal tar dye and used that, taking the eggs out and selling them."

"They seem to think that because the coal tar dye is harmless they can get away with it. That seems to be the argu-

ment put up to them by the salesmen for coal tar dyes."

With all due respect for the salesmen of coal tar dyes, and for Dr. La Wall and Inspector Simmers it is time to differ with them as to the "harmfulness" of such dyes.

They may be harmless to the stomach but every baker who has ever forgotten the look of real eggs in his shop has lived to learn that coal tar dye is very harmful to his monthly balance sheet.

John Hartley, guide, philosopher and friend, of many a small baker, has told us too often of the experience of bakers who abandoned good fresh, natural food-stuffs on the advice of clever salesmen, for there to remain any doubt about that.

"I was making good money," runs the story many a baker who has told it to us in our National headquarters, "and I sold out to a man who used substitutes for fruit and eggs and pretty soon he failed. My trade abandoned him inside of three months."

It happens that there is the best of scientific proof to demonstrate a reason for what is here set down.

In an animal feeding experiment, rats were fed on natural foods rich in proteins, fats, carbohydrates and vitamins.

The vitamins are stored by nature in eggs, in milk, and in fresh green vegetables, especially leafy vegetables. Then some of the test animals were put on a diet rich in fats, proteins and carbohydrates, but without any vitamins. Almost immediately the food intake dropped, until only half the usual amount of food was eaten.

APPETITE HAD BEEN FIRST TO SUFFER. When the animals were killed it was found that their food was not digesting. Something was lacking. It left the food to lie in a fermenting mass.

Then some food rich in vitamins was

added,—just the slightest tinge of it. AND APPETITE CAME BACK. Digestive processes were restored, and the animals grew well and happy again.

Eggs in cake are rich sources of VITAMINS. That means they are rich sources of APPETITE APPEAL. So also it is with milk. It is no wonder therefore that customers of bakers using coal tar dyes turn away from them, following a true food hunger or a true repugnance for a food that does not benefit the body.

Rich in romance are some of the stories of the Baking Industry's fight for better ingredients and a QUALITY LOAF. There was the case of Mr. Read. He sold the trade substitutes for natural food,—and found himself out of business when the Wiley pure food laws were passed. He turned to machinery and now sells mixers that save thousands from drudgery. His firm has turned to a field of great usefulness to civilization, to the baking industry, and especially to housewives for his mixers are small enough for every kind of labor formerly done by hand in mixing kitchen ingredients.

There is another bit of romance in this field. It is the romance of Jay Burns who spoke up against this sort of thing, and was set upon as a foe of little bakers. He would have saved them this fine and these arrests—if they had only listened to the voice of real and zealous leadership!

### *Michigan to the Fore*

SELDOM has any baker's convention developed into such interesting sessions as those of the Michigan State Convention at Lansing, Nov. 14 and 15. They made the State Association a member of the National after real bakers had discussed real bakers' problems for ten or twelve hours. Thus another pillar is added to the solidity of our New Growth.



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entered in the post-office at Chicago, Illinois, as second-class matter, under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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NOVEMBER 15, 1922

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### *The New Ward Loaf*

SOME years ago George S. Ward declared that he would rather be a baker of bread than President of the United States.

He is now baker of a new kind of bread, news of the introduction of which in the Boston market is carried in the newspapers of all principal American cities.

This loaf of bread can be obtained only in Boston for the present. It is described as a white bread loaf, slightly yellower in color than the whitest of loaves, but so rich in mineral salts, vitamins, and all that is lacking in white bread to complete the list of elements needed to sustain life, that it will in and of itself support life through continuous generations.

A large plant at Warren, Ohio, extracts from seeds the necessary ingredients for the dough mix, in order to make this bread a complete food.

This bread is interesting the Nutrition experts. It has long been available for feeding experiments to the principal professors of the food research departments of Yale, Harvard, Johns Hopkins, Columbia, and the Mellon Institute.

For George Ward it constitutes another daring adventure into new and untried baking fields. He read the literature of the Newer Knowledge of Nutrition. Instead of flaunting it, he adopted it and put it to work. Whether the public take to the new bread or not, it will take its place as evidence of daring and adventure, backed by a great amount of money on the part of one who gets real joy out of being a baker.

### *Good for Rabenold*

THE baking industry needs men in public life. Ellwood M. Rabenold, chief counsel of the American Bakers Association, emerges from the November elections as a member-elect of the New York State senate.

Senator Rabenold will carry to Albany with him a strong bill aimed at the return of stale loaves of bread. It will do much to put the American breadstuffs industry on a plane where it will be respected by all as doing its utmost to give the people the kind of bread they are entitled to.

Similarly, Royal B. Copeland, health commissioner of New York, goes to the United States senate as its only member from the medical profession. In becoming a Senator Dr. Copeland carries to Washington with him perhaps a closer contact with and respect for the breadstuffs industry than any other man who has entered the National congress. At a recent convention of bakers he stated that he considered the man who baked a good loaf of bread a better friend of modern civilization than almost any other member of it. He knows the Modern Loaf. He respects it.

In these two public servants the baking industry may well take great pride. Its best wishes and congratulations go with them into their new fields.

## *Congratulations, Mayor Jago*

FEW men of science have done so much to bring the realization of what science means to the bakeshop home to the working baker as Prof. William Jago. He lives in person on the other side of the Atlantic, but in spirit he lives on this side through his splendid articles in the magazine, "Baker's Helper," and a personal memory left after his tour in America last year.

All members of the baking industry therefore will rejoice that to his attainments as a scientist Prof. Jago now adds the achievement of a high place in the political life of his own country. He has just been chosen for the office of Mayor of his home town, Hove, in Sussex, Eng-

We can all rejoice that besides being an inspiring teacher to all the World of Bakerydom Prof. Jago is recognized as a good friend and neighbor by "the home folks." At the same time we feel almost a tinge of jealousy that the world to which he so naturally belongs has to share him with the folks of Hove. We trust they will spare him some time for the Science of Baking, and will also prod up the bakers of Europe in general until they build that British Bakers' University in which they propose, as soon as it can be financed, to house Prof. Jago.

## *Out of Gas*

ONE of the greatest needs of the Baking Industry is a set of fly swatters for spreaders of malicious gossip. During the long period while the American Institute of Baking had to hear its motives and purposes and achievements maligned with every form of venomous gossip, its leaders knew that the thing to do was just to "carry on." And in the end the truth broke through, as to the service set up

here FOR THE BAKING INDUSTRY by devoted leaders having no wish at heart but the progress of their industry.

## *Toast for Dinner*

A CANADIAN family where this chronicler was recently a guest served for dinner six different kinds of toast with bacon. It was a speedily prepared meal but its partakers enjoyed it greatly. There was raisin bread toast, whole wheat bread toast, white bread toast, malt bread toast, and even toasted rolls.

Canada uses materially more wheat flour per person than does the United States. Is it that our neglect of toast is responsible for this?

The American Institute of Baking's campaign for toast, with an electric toaster for every electrically-lit American home, is making rapid progress. We found that there were practically no toasters on the market capable of taking slices of bread from the standard pound-and-a-half loaf. We have developed such a toaster and are experimenting with cost of production.

## *At Hammond, Indiana*

WITH the Mayor, the leading banker, and prominent Rotarians of Hammond, Indiana, as well as prominent bakers from all parts of the country, participating, the first loaf of bread was taken this week from the new bakery of the W. E. Long system, at Hammond, Indiana.

The bakery is the last word in scientific construction; its bread goes upon the market with a general invitation to all to come and visit the plant. When will all bakery doors be open this way to the public? In this case plate glass walls spread a constant gospel of cleanliness and sanitation within.



# A National Magazine on Bread

*Modern Priscilla Tells Our Story to Thousands of Women in Article  
by Dr. H. E. Barnard*

The story going out to the housewife about bread is differing hourly and daily from that formerly written. Not only do writers of national repute call frequently at the American Institute for material for articles but the Institute's director is himself called upon to contribute articles to some of the largest and best of the women's magazines.

In *Modern Priscilla* for November doubting housewives are told by Dr. Barnard in these terms what the *Modern Loaf* has behind it for the *Modern Housewife*:

Today apartments and kitchenettes are supplanting the homes of years ago. The family kitchen as a food manufacturing establishment is gone forever. The grocer and delicatessen shop carry on their shelves very essential food, and can openers are the most important utensils of the modern kitchen.

It is no longer women's work to bake and brew any more than it is to spin and weave. But there is still a lingering doubt in many minds as to the character of the food supply which comes ready made into our homes. There has been no fear of the quality of the woolen and cotton and linen cloths which have succeeded the home-spuns and even our grandfathers cannot remember when the cobbler came to the home to make the family shoes. But the food manufacturer must still strive to impress the virtues of his goods on the minds of consumers.

There was a time when one of the measures of women's efficiency was her ability to make good bread. Today it is as unfair to judge the merits of a home maker by her bread as it would be to expect her to

qualify as an expert weaver of linen or brewer of small beers. Bread is a factory product, manufactured in quite the same fashion that other household necessities are. The baker who makes bread by the hundred loaves at a baking is furnishing bread today which looks better than the home-made loaf, tastes better and keeps fresh longer. He takes the best flour from the mills, blends it under the direction of scientifically trained men, builds it up with condensed or dry milks, sweetens it with sugars and malt syrups, adds shortenings to enrich it and prolongs its keeping qualities, ferments the dough under ideal conditions of temperature and humidity and bakes it in great ovens which never vary in the kind and amount of heat they contain.

There was a time when bakers advertised that they made bread "like mother used to make." Today they do not recognize the competition of the home-made loaf.

Until recently the great flour mills have catered to the demand of the cook in the home for small packages of flour. Today, while still grateful for the business which comes through the grocery store, the modern miller looks to the manufacturing baker for his largest outlet. No other evidence of the passing of baking from the home is more conclusive than the rapidly changing flour market. We may well hope that the time may never come when an occasional batch of hot biscuit or griddle cakes fresh from the kitchen stove does not help to bring back pleasant memories, but bread and even cake making is no longer to be counted as a household duty.

# Do You Want This Bread Law

It Is Recommended to All States by the Fourteenth Annual Conference of  
Representatives of States Held at the U. S. Bureau of Standards,  
Washington, D. C.

Enforcement officials in all parts of America are showing increased interest in new laws regulating bakers. Bakers must for their own protection understand these laws and what the industry as a whole thinks of them.

The proposed law printed below was taken as a guide by U. S. Officials in a conference with a committee of the baking industry at which H. E. Barnard, R. M. Allen, and Jay Burns represented the American Bakers Association, C. J. Kremer of Milwaukee represented the National Retail Bakers Assn., and Ellwood M. Rabenold was present as counsel of the American Bakers Assn. An accompanying report of this conference shows how the government officials adhered to the provisions of this "model law." Its study is recommended to all bakers. Opinions are solicited on its practicability. They will be used by these headquarters to get the fairest terms possible for the baking industry at Washington:

Sec. 1. That the standard loaf of bread shall weigh one pound, avoirdupois weight. All loaves of bread manufactured procured, or kept for the purpose of sale, offered or exposed for sale, or sold, in the form of loaves, shall be of one of the following standard weights and no other, namely, one pound, one-half pound, one and one-half pounds, or multiples of one pound, avoirdupois weight: Provided, however, that the provisions of this Act shall not apply to biscuits, buns, crackers, rolls, or to what is commonly known as "stale bread" and sold as such, provided the seller shall at the time of sale expressly state to the buyer that the bread so sold is "stale" bread. When twin or multiple loaves are baked, the weights specified in this Act shall apply to each unit of the twin or multiple loaf.

Sec. 2. That the (insert title of enforcing officer) shall enforce the provisions of this Act. Rules and regulations for the enforcement of the provisions of this Act not inconsistent therewith, shall be made by the (insert title of enforcing officer) and such rules and regulations shall include reasonable variations and tolerances, in excess and deficiency, which may be allowed.

Sec. 3. That it shall be unlawful for any person to manufacture, procure, or keep for the purpose of sale, offer or expose for sale, or sell, bread in the form of loaves which is not of one of the weights specified in Sec. 1, within such variations and tolerances as may be fixed by the (insert title of enforcing officer). Any person who, by himself or by his servant, or agent, or as the servant or agent of another, shall violate any of the provisions of this Act shall be guilty of a misdemeanor and shall be punished by a fine of not less than \$25.00 nor more than \$200.00 upon a first conviction in any court of competent jurisdiction; and upon a second or subsequent conviction in any court of competent jurisdiction, he shall be punished by a fine of not less than \$50.00 nor more than \$500.00 or by imprisonment for not more than six months or by both such fine and imprisonment, in the discretion of the court.

Sec. 4. The word "person" as used in this Act shall be construed to import both the plural and the singular, as the case demands, and shall include corporations, companies, societies and associations.



### *For Ten Thousand Members*

THE baking industry is facing too much in the way of adverse legislation to go at it blindly, and I would like to see the local associations, such as ours here in East Tennessee, merge into the State, and the State Association merge with others into a great National which will do our future work. If this could come about there would be great things ahead for progressive bakers.

Personally I should like to see the dues of the National at from \$10 to \$12 per year per oven, with a membership of from ten to twelve thousand bakers. A dollar looks as big as a mountain to the small baker but if he can be made to feel that he is not being crowded out he is more apt to become a member. Then through becoming a member he is more apt to get the big vision that will mean greater membership fees and more ovens.

Kindly advise our little association of any activity that may help us in doing our duty to the National.

—From a letter of John P. Kern, secretary of the East Tennessee Association of the Baking Industry.

### *A Hoosier Foregathering*

A VERY instructive program is being arranged for our next meeting January 10th and 11th," writes C. P. Ehlers who has given years of effort to building up an Indiana bakers' organization, "and AS THE LEGISLATURE ALSO MEETS IN JANUARY a great many subjects may come up that will be of vital importance to ALL BAKERS OF THE STATE."

Mr. Ehlers sees with a clear vision why bakers must meet together to win together their due share of progress. He knows the old day of a few carrying the load for the many must pass if the many are to win what they have a right to.

### *Our Bread of Life*

IN ORDER that every student at our School of Baking might have experience with all types of flour on the market, millers from all over the country were asked to cooperate in keeping the bake shop going. We knew from experience that students going out into the industry from schools using one type of flour only began to protest, often, at strange types they encountered in places where they were employed.

The millers gave the flour. What then was to be done with the students' bread? Every batch that came from the ovens turned out to be first class bread. It seemed unfair, unless Chicago bakers should fully consent, to enter their markets with it. Therefore the Chicago bakers were called in for consultation as to worthy recipients who could not afford to pay for their bread.

One charity after another received bread supplies from these young students of ours. And here are some of the tributes received that in righteousness should be passed back to the flour men who gave the flour and the machinery men who supplied the equipment in which it was baked:

### *Appreciative Letters*

"The Auxiliary Board of the Children's Memorial Hospital wishes to thank you for your generosity in sending 400 loaves of bread to the hospital in August. This is a real kindness and a saving to the hospital and your kindness in remembering us meant a great deal in every way.

ALTHEA CUNNINGHAM,  
Corresponding Secretary."

"Well, Mr. Pirrie, we appreciate greatly your kindness towards us in giving us bread for the Little Sisters of the Poor. May God bless you and reward you and yours.

SISTER CECILE,  
Convent of the Little Sisters of the Poor."

### *Small Bakers vs. Large*

WHILE at the Chicago convention I heard on all sides complaints because the small men did not cooperate and all the time there seemed clear evidence that there were few who cared enough or knew enough about the small shop problem to come down to earth.

It seemed evident to me, in spite of this, that the American Bakers Association can be of great service in directing educational programs on a National basis, encouraging the use of bakery products, and attending to legislative and tariff matters. I believe that affiliation with allied trades to boost the use of bread is timely and imperative. A united front managed under one head, will win.

The American Institute is a wonderful monument of baking progress. Its influence will be felt more and more as it enlarges its scope of service. But here again it is going to require extreme diligence to keep it directed towards the industry as a whole and not that part of the industry which has controlled destinies up to date.

—A letter from a Mid-Western Baker.

Frank words are those from our friend. And the bugaboos he mentions are among the worst foes of cooperative organization in our industry. If this good baker could see our laboratory records he would know that the men he fears may "control" the Institute are all rich enough to run their own laboratories and solve their own problems; those who keep our service men busy are rightfully the small and medium sized bakers who can obtain here all that the biggest bakers find it necessary to build their own laboratories to obtain. Some day when this fact is thoroughly understood in the industry the far-seeing pioneers who drove ahead even of the vision of their associates, will come into their own.

### *Student Feeding in Moscow*

FROM nearly all over the world stories continue to pour in which show that most other nations eat more bread than America. Just now there arrives six sample menus from starving Russia. They are fed on succeeding days of the week to the students of Moscow, and the odd thing about the six is that only one food is **staple to all**.

This food is BREAD. Bread not only remains while corngrits, potatoes, meat, rice, cabbages, onions, cocoa, milk, and sugar rotate, but it remains in predominating proportion. The amount never varies. It is 186 grams per day. On Monday the diet is 186 grams of bread with 8.53 of mushrooms, 8.5 of corngrits, 16 of fat, 70 of rice, 13 of sugar, 30 of milk, 4 of cocoa, and 4 of potato flour.

On Tuesday the 186 grams of bread are supplemented by 70 of beans, 4.98 of onions, 16 of fat, and 16 of sugar. On Wednesday, to add to the 186 grams of bread there are 23 of meat, 95 of rice, and 25 of fat.

On "meat and potatoes day" there are more potatoes than bread slices, but this is the only food that outweighs bread at any time. Then they serve 410 grams of potatoes with 23 of meat, 17 of fat, 30 of sugar, 66 of milk and 5 of flour.

Here indeed is bread serving as the "staff of life." It enjoys its rightful position at the heart and center of the dietary, with just enough "trimmings" to fill out. And these rightfully consist of milk, meat and fats with green leafy foods enough to assure plenty of mineral salts and vitamins.

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I find Baking Technology to be excellent in character.

DR. T. J. B. RYAN, Ph. D., D. SC.  
Chief Chemist, Calumet Baking Powder Co.



# An Enquirie from London

## *On an American Plan for Miller-Baker Advertising*

ECHOES of things done in America often clarify themselves overseas more sharply than they do here. American bakers have a wonderful field to attack with united power—the expanded market to be won among the 50 per cent of American housewives who still bake their own bread.

Once the milk people fought each other with anger, jealousy and all manner of bitter internal resentments, for the market **ALREADY DEVELOPED**.

After seven years of internal struggle they clarified a program and built a Headquarters and now they sell about three quarts of milk, at almost a doubled price, to what they sold before. And the doubling of the price has meant a tripling of service, a perfection of sanitary handling methods, and a building up of public confidence in milk such as the world never knew before.

The conquest of a **NEW MARKET** the milk men made lies all before the bakers, inviting them to cooperate, to cease internal hatreds, to learn to see other bakers in a more friendly light. And just as the milk men made their conquest, so did the orange men.

The writer remembers when a Southerner in New York was considered disloyal if she ate a California orange and when the fiercest of price-cutting campaigns marked the entrance into the market of the first of either crop. Then all at once Florida and California leaders—the wise men out of each group—put up money to advertise not Florida oranges or California oranges, but just the **HEALTHFULNESS OF ORANGE JUICE**. When California and Florida joined hands in a selling campaign, instead of having 5,000

car loads too many a year they had 17,000 car loads too few and after years of failure, in which orange groves were cut down, a call for new plantings went from edge to edge of all suitable orange land in our country.

If the baking industry's members could only concentrate their hopes and hearts upon the 40 to 50 per cent of uninvaded selling territory, they would work out most of the other problems that beset us in a great hurry.

Dr. H. E. Barnard told the Millers' Convention at Kansas City something to this effect, in laying out a platform for co-operative advertising. And over in London the bakers and millers echoed back this sentiment. The National Association Review reprinted the address and "A Country Baker" thus wrote about it to the Review:

I have been much interested in reading in the American papers the address by Dr. H. E. Barnard at the Millers' Convention at Kansas City. This gentleman as you know is Controller of the American Institute of Baking. In the States I believe some forty per cent of the bread consumed is made by the housewife and therefore there is a very wise scope for bakers to advertise the advantages of factory-made bread.

Now Dr. Barnard looks beyond this 40 per cent. He contends that by judicious and persistent public advertising the actual consumption of bread per head might be increased. Now I believe the time has come when millers and bakers who are both interested in the consumption of bread could combine at a very slight cost per individual to materially increase that consumption.

Dr. Barnard gives many practical suggestions for creating an interest on the part of consumers in the value of bread as a foodstuff,—particularly with regard to the feeding of children. The more the trade can encourage children to eat bread the greater will be the results because future generations will naturally be bigger bread eaters. I am only an humble member of the

National Association and cannot claim to put this great scheme before the trade so effectively as others might but I think the members of our Council should carefully read Dr. Barnard's address and consider whether it is possible to carry out a big advertising campaign in conjunction with the millers, somewhat on the lines I have indicated.

"A Country Baker."

The Editor of the Review assures his readers that he wants every one of them to think of this cooperative advertising campaign and send in his views on it. Thus England and America may double-fire on the plan eventually.

### *How Bakers and Millers Work in New Zealand*

AT the present time in New Zealand the millers' trade is in a somewhat unsatisfactory position but there is an effort being made to form a strong Millers' Association, and if this eventuates we believe it will be of material benefit not only to the millers but also to the Baking trade of the dominion. There is a growing feeling here that the interests of the baking and the milling trades are identical and that because of this we can co-operate with a view of safeguarding our mutual interests. Due to our small population you quite appreciate the fact that it might be possible to do here what would be impossible where the population is much larger and where, in consequence, there are many more millers operating than in this small country of ours.

J. HEATON BARKER,  
Secretary, New Zealand Bakers' and  
Pastrycooks' Association.

### *On Going to Church*

I BELIEVE in the church because the man who has no church connection is a poor citizen in any country; in fact, I would say he is almost an "undesirable."

The church helps a man to aim high and work hard. Its teachings point us to the fundamentals and the realities of life—to the golden rule, "Love thy neighbor as thyself."

There never was a time in the history of the world when man was called upon to love his neighbor more than today, when there is so much unrest, turmoil, faithlessness and distrust everywhere we go.

I wish the world were full of rotarians, people who rotate to those around them kindness, religion and service, and NOT selfishness.

It is not so much NEW THOUGHT the average human being needs. It's the old, old thought, with a new spirit, "Do unto others as you would that they should do to you."

Sir Harry Lauder,—in a newspaper interview.

We are happy to be able to inform Sir Harry that there is one world at least that is "full of Rotarians." This is the world of Bakerydom.

The latest foothold Rotarians have obtained in this world is down in Texas. There Julius Schepps, president of the Texas association, and George Schepps, secretary of the association, held a little Rotarian celebration at one of their branch bakeries. They welcomed the Rotarians to the bakery, set a spread before them and had a "bakery evening" in the presence of the machines that turn out the Schepps products. Many other Rotarian bakers have had similar evenings.

Almost every day this headquarters receives a letter from some baker: "I have been asked to prepare a talk for Rotary, please tell me some good things to say." Besides having three Rotarians in the family of W. H. Korn, our president, we have at least one in every important city where baked goods are prepared.



# New Light on Baking Science

*As Furnished by Our Bulletins Number Eight and Nine*

By DR. ROSS AIKEN GORTNER

*Chief of the Division of Agricultural Biochemistry, University of Minnesota*

Of those devoted scientists and teachers to whom the modern world owes so much of its present enlightenment, only a few have sought to find out all that may be learned about wheat and flour. Conspicuous among these few is Dr. Ross A. Gortner, of the University of Minnesota. In our May number we told how he was diligently at work trying to grow plague-proof wheat for the barberry belt, and trying to tighten up the soft glens of Southwestern wheat against the day of the exhaustion of virgin fields, where the hardest wheats are grown. Dr. Gortner inspired two scientists to work long and faithfully on tasks within our research laboratories. We were proud to publish their results in our Bulletin Series. We are now glad to publish Dr. Gortner's appraisal of them as important contributions to the Literature of Breadstuffs.

There have recently appeared two Bulletins of the American Institute of Baking, Bulletin 8, "The Diastatic Enzymes of Wheat Flour and Their Relation to Flour Strength," by Dr. Louys A. Rumsey, and Bulletin 9, "Flour Strength as Influenced by the Addition of Diastatic Ferments," by Dr. Ferdinand A. Collatz. These bulletins are the end products of a rather extensive series of researches and the question may now be asked as to whether the effort spent in these researches can be justified by the results which have been gained. I personally feel that this should be answered unqualifiedly in the affirmative. The data included in these bulletins are of the utmost importance both from the standpoint of the science of biochemistry and from the standpoint of the baking industry.

The diastatic enzymes are biological catalysts which break down starch into sugars and thus make it available as food for the yeast plant. The scientific literature is replete with researches into the nature and end products of diastatic activity. The literature of cereal chemistry contain many references to the importance and action of diastatic enzymes.

These researches have been excellently summarized in the present bulletins, nevertheless, surprising as it may seem,

**the behavior of diastatic enzymes on raw starch** was practically an untouched field. It is raw starch, not cooked or gelatinized starch, that must ordinarily be utilized by the yeast during the fermentation of the dough and the authors are to be congratulated in that they used the raw starch (or flour) as their basic material. The conclusive proof that their work affords, that data obtained on gelatinized starch do not necessarily have any relation to what would happen on raw starch, is one of the outstanding scientific facts presented in these bulletins. This observation should, of itself, markedly modify the course of future biochemical research in the baking industry.

## *Important to the Baker*

The studies on the effect of temperature and of acidity (hydrogen ion concentration) on diastatic activity and fermentation are exceedingly important from the scientific standpoint, but should be even more important from the standpoint of the baking industry. These studies serve to explain why temperature control is such an important factor in the bakery and why rule-of-thumb methods must sooner or later give way to chemical control.

The general public is satisfied to believe that flour is simply "flour" and is in-

clined to believe that the baker has an easy job. All he has to do is to mix flour, water, salts, sugar, yeast, etc., together and turn out a fancy loaf of bread at a profit. The baker knows that "flour" is a very general term; that there are as many kinds of flour as there are wheat varieties and wheat growing regions and that each flour has its problems for the bakeshop.

But even the baker is inclined to lay most of his troubles at the door of "gluten" and to ignore other factors which in some instances are even more important. Undoubtedly the gluten is **one** of the major factors, but it is not the only one. A careful study of the present bulletins should convince the reader that enzymes, temperature control, and hydrogen ion concentration must become the working tools of the baker if he is to prepare the **superior** loaf of bread. In other words, chemical control must be practiced in the bakeshop just as it is practiced in the other major industries of the country. The bakeshop with the most efficient chemical control and the chemist trained in the more modern aspects of chemistry is the bakeshop which will succeed in the period just ahead. Research in baking problems has only begun.

### *More Problems Ahead*

These bulletins contain exceedingly important data, but these data also raise other questions and suggest new problems equally important. They should be of interest, not only to the baker but also to the miller. The marked correlations between enzymes content and baking value of the flour would suggest that it might be profitable for the miller to initiate experiments of blending wheats in order to produce a flour having the desirable enzymatic characteristics.

As I stated earlier, I believe that the

efforts spent on these researches have been amply justified, and I sincerely hope that these researches are merely a sample of more to come.

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### *Flour Strength Bulletins*

Our bulletins, No. 8 and 9, which tell of conditions affecting flour strength, are appealing to many production managers in bakeries. There are now about 1,000 men out in the industry who have graduated from trade schools such as the old Chidlow school, the Siebel Institute, the Dunwoody Institute, the Central Continuation School of Milwaukee, the Sam Goetz Traveling School, which John Hartley shoves along with such devotion into all territory where the small baker has a need to know of Sweet Goods manufacture, or one of the university extension courses.

Recently F. O. Stone, of Dallas, Texas, and Cincinnati, Ohio, came into our National Home. Unlike most visitors, he did not merely go through each department of the research laboratories, the experimental bakery, and the shop school. He spent almost a day in each department and asked questions by the score. It turned out afterwards he had been one of the pioneer students at the original Chidlow baking school, and had carried away an incurable curiosity about baking courses. It had been the foundation of all his years as a cake and bread manufacturer, prior to his election to our Board of Governors.

In a convention we attended recently in Toronto, Canada, the most earnest advocate of education for the baker, was Dent Harrison, president of the Canadian association. His son had gone to the Dunwoody Institute and had made the bakery pay so much better upon his return that the father could not too strongly urge education in baking science for all.



# Bad and Good Shortenings

*How to Avoid Rancidity Problems in Bakeries as Seen By a Veteran American Chemist*

WHEN you see iron grow rusty while gold does not, and some fats grow rancid while some do not, do you ever stop to think that both processes are very much alike, and that some of your shortenings might be called "iron shortenings" while other might be called "gold shortenings?"

You want to know all about shortenings, because the time has come when the progressive baker must know all about everything he uses. And when it comes to telling you why you want a shortening of a "low iodine number" instead of a "high iodine number" there is no authority to teach you compared to that stable old veteran of the world of fats and oils, David Wesson.

Wesson is one of the men of Science who **applied** their Science to problems the Breadstuffs Industry has had to solve. His interesting view of the SHORTENING PROBLEM of the modern baker is given below; as told by him at a conference of the Biscuit and Crackers Manufacturers Association.

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Some years ago while travelling over the Lake Shore Railroad between Buffalo and Cleveland, I met an engineer. We chatted along on the subject of engineering practice, factory organization and methods till we reached Ashtabula. Here the subject turned to the horrible disaster which happened there many years ago when the bridge broke down and let a passenger train and a lot of oil tanks down into the ravine with great loss of life. According to the custom of those days, a small model of the proposed bridge was first made and then tested

with weights, then the bridge was built on the large scale.

Engineering practice has greatly changed since then. Today, an engineer, in designing a bridge, first calculates the load it will have to carry and then from carefully worked out formulas, calculates the size of the steel beams, rods and braces going into all parts of the structure. He goes still further. He must know the strength of the steel used and not only tests samples by actually breaking them in a testing machine but submits them at the same time to chemical analysis. The steel is ordered according to definite specifications and the makers of the steel test it both for breaking strength and chemical composition before shipment. With modern practice there is little danger of the Ashtabula disaster.

In the baking industry we are a little further advanced than the engineers who designed the bridge across the Ashtabula Creek. The American Institute of Baking is making the tests and calculating the formulas which guide the baker in his work. The chemists in the laboratories of many well equipped bakeries stand behind the buyer of raw materials, and the chemists and technologists who are manufacturing shortenings are making better products all the time. We know in a general way that certain fats and oils will stand up better with less liability of rancidity than others. At the same time few of us know the reason and have to depend largely either on our experience or the eloquence of the manufacturers' representative who calls new products to our attention.

Fortunately, advancement in chemical science during the last 20 years has cleared away many of the mysteries surrounding the whole subject of fats and oils and when we are about to perpetrate a new formula for a bread or a cracker we should be able to predict with certainty just how the fat we are going to use should behave, in the same way as the engineer who knows the analysis of the steel he is going to use, can predict what load it ought to carry if the steel has been properly handled in the making.

### *The Ideal Shortening*

The ideal shortening material for long keeping is one that will keep indefinitely without making its presence known except by its shortening effect.

In selecting shortenings, we are limited commercially to vegetable oils, animal fats, and specially prepared shortenings made from either vegetable fats alone or from mixtures with hard animal fats. Practically cottonseed, maize, peanut, soya bean and cocoanut oils are the only vegetable oils with which we come in contact, while lard, beef fat and butter, when we can afford to use it, comprise the animal products.

The above materials may be considered fundamental and a study of their chemical make ups should guide us in the selection of the best shortenings for a particular use.

Broadly speaking all the fats which have been mentioned are made up of compounds called glycerides which are bodies containing glycerine and fatty acids. All fats contain glycerine, but they owe their distinctive properties to the character of the fatty acids with which the glycerine is combined. For example, when metal sodium is combined with chlorine it makes common salt, when combined with carbonic acid it makes

carbonate of soda, with sulphuric acid it makes glauber salts. It is the same old sodium but there are different kinds of salt depending on the different kinds of acid.

### *Four Fatty Acids*

With the exception of cocoanut oil and butter fats, we have to deal mostly with only four fatty acids, namely, Stearic Acid which is a white hard solid melting to an oil at 155° F. and occurs in most hard fats along with Palmitic Acid which resembles Stearic Acid but melts at a lower temperature, namely, 146° F. Oleic Acid is the common liquid constituent of practically all fats and oils; Linoleic Acid which resembles Oleic Acid in many of its properties but is especially prevalent in the drying and semi-drying oils.

If glycerine were combined only with Stearic Acid we would have a hard fat called Tristearin. If Palmitic Acid only were present we would have palmitin, and in a like manner, we could have with oleic acid, olein, and with linoleic acid, linolein. Unfortunately, our problem is not so simple, as we seldom find the simple glycerides in nature. Instead we will find two or three fatty acids combined at once with glycerine making products called mixed glycerides. We might consider fat as houses built up of four different kinds of bricks. The character of the house would obviously depend on the proportion of the different bricks used and their arrangement.

### *Saturated vs. Unsaturated*

The four fatty acids mentioned belong to two great classes, namely, saturated and unsaturated. A saturated acid will not combine with oxygen of the air and therefore cannot become rancid. An unsaturated acid takes on oxygen readily and the oxidation products have very disagreeable tastes and smell and are said



to be rancid. The mere fact that the fatty acids happen to be combined with glycerine makes no difference in regard to the absorption of oxygen. The amount of oxygen which a fat will absorb depends on the character and amount of the unsaturated fatty acids which it contains.

Pure stearine and palmitin absorb no oxygen. Olein will take up about  $5\frac{1}{2}\%$  of its weight, and linolein will take up twice as much, or 11%.

For convenience, chemists measure oxygen absorbing capacity of fats and oils by finding how much iodine they will combine with. This is called the iodine number of the fat. The iodine number multiplied by 6.25% gives oxygen absorption.

What we want in the ideal shortening is a fat with a low iodine number. The iodine numbers of various common fats are as follows:

	Iodine No.	Oxygen Capacity
Linseed Oil .....	179	11.15
Soya Bean Oil .....	137	8.57
Corn Oil .....	120	7.50
Cottonseed Oil .....	110	6.90
Peanut Oil .....	93	5.80
Cocoonut Oil .....	8	.5
Lard .....	46-70	3.75
Beef Tallow .....	38-46	2.70
Oleo Stearine .....	20-30	1.56
Butter Fat .....	26-50	1.75
Vegetable Shortenings .....	90	5.56
M. F. B. ....	78	4.85
Coprol .....	8	.5
Hydronut .....	0-2	.25

### *A Low Iodine Number*

The iodine number does not tell the whole story. Two fats might have the same iodine number, but owing to their structure, one might oxidize much more readily than the other. A log of oak wood takes fire slowly but the same log in the form of shavings will ignite readily. The oxidation of fats is nothing more

nor less than combustion. If cotton be greased with linseed oil and put in a warm confined place, it will heat up and take fire. If on the other hand, cocoanut oil be used in place of linseed oil, it will never heat up. Iron will rust in damp air while gold will remain bright. It occurred to the writer that this principle might be used to compare the rancidity tendencies of different fats. The following experiment was made:

Equal weights of various fats and oils and absorbent cotton were carefully worked together and the several samples of greasy cotton placed in small preserve jars with the covers held in place without gaskets. The jars were placed in an oven and kept at 212° F. for  $3\frac{1}{2}$  hours, then cooled down and examined by removing the covers and smelling contents of the jars.

The grading was as follows:

Hydronut .....	} Sweet
Coprol .....	
M. F. B. ....	
Hydrogenated Cotton Oil made similar to M. F. B. by competitor .....	} Slightly Rancid
Hog Lard .....	
Vegetable Shortening .....	Rancid
Peanut Oil .....	} Very Rancid
Corn Oil .....	
Cotton Oil .....	

(All were well known brands.)

The best samples were replaced in the oven and heated two hours longer. After cooling, as before, the Hydronut, Coprol and M. F. B. were still sweet. The competitor's hydrogenated product and hog lard were very pungent.

### *A Test for Any Fat*

This very simple test is one which can be applied readily to any fat. It will show in a few hours what its keeping

qualities are. The test is severe and depends on a large surface of finely divided fat at a high temperature to give quickly what would otherwise require months.

The fats which stood up the longest under the test are obviously the best materials to be used where goods are to be kept for long periods of time. Again when sugar is used, as in a cracker, it melts at the heat of the oven and forms a coating of candy which prevents the air from coming in contact. For this reason shortenings will remain sweet very much longer in such goods than it will in unsweetened products. If we only used fat for its shortening properties, probably the ideal fat would be an oil which had been hydrogenated to the limit, but such a fat would be as hard as ivory and brittle as glass. We therefore have to use a material which has the proper plasticity. To secure this we must have some of the softer constituents of fats present. The least objectionable one is olein. Olein will absorb oxygen, but it does not absorb it to anything like the extent as linolein. By the process of hydrogenation, it is possible to change the linolein of a fat to olein and also to stearine. Such a fat will give the maximum resistance to oxidation with the proper degree of consistency.

Of course, it goes without saying that in order to make a perfect shortening the fat must be prepared in such a way that it contains no impurities which would adversely affect its flavor, and no matter how skillfully a fat might be hydrogenized so as to give it the proper consistency, it must be handled in such a way as to be without flavor or odor so as to be chemically pure before it is sent out to the customer. In order to obtain these results great care must be given in the selection of materials and in the proper refining and finishing of the product. A great artist, when once asked how he achieved

such wonderful color results, replied that he mixed his paints with brains. In the same way the manufacturer of the best shortenings has to use something besides fat. He has to put in scientific knowledge, experience and constant vigilance along with the raw materials.

DAVID WESSON.

### *A Bad Practice Stopped*

**BAD** publicity for most all industries continued year after year until the leaders of those industries themselves shaped their affairs until they did not deserve such publicity and then went out and gave battle to it.

"The finest flavored eggs you ever tasted are sold from our farm at the lowest price," a big egg dealer in Chicago advertised on thousands of post cards to city consumers.

"All others," the advertisement went on, "ARE SOLD TO BAKERS."

Dr. H. E. Barnard, manager of the American Bakers Association, wanted to know of this dealer "what bakers brought all others." He also wanted to know why such advertising, with the bad name it unjustly gave the baking industry, was put out for the public consumption.

"Since you have inquired of us so pleasantly," the head of the offending firm wrote back, "I am pleased to say the above mentioned statement will BE ELIMINATED from future ads.

"I am contemplating selling tub butter to bakers and any suggestion you may offer to assure bakers of a sanitary, pure product will be appreciated."

This, indeed, is a change from old days. The American Institute of Baking's Director is constantly running down such harmful bits of publicity and stamping them out for the good of the industry.



# A Perennial Nuisance

*The Return of Stales Continues to Arouse Much Unfavorable Public Sentiment*

**H**ARDER words against the baking industry have seldom been uttered by a public official than those where-with R. M. Black, head of the division of Dairy and Food Inspection of the state of Ohio, denounced the return of stale bread to bakeries.

His castigation was addressed to inspectors whom he urged to make every arrest possible. Housewives, of course, read it with concern.

The Food Research Institute of Stanford University found that excessive return of stales threatens the "financial success of the bakery, tends to raise food costs, and leads to needless waste of food products."

Newspaper editors, legislators, the lay public, and household economists all find an opening wedge here for flings at the baking industry. The Northwestern Miller, a splendidly edited paper of the breadstuffs industry, sees the choice that is apparently left for voluntary action by the bakers in this field or else for fiat legislation that may go much further than the baker desires.

Dr. H. E. Barnard, manager of the American Bakers Association, brought back to headquarters from an annual meeting of food officials at Kansas City, a report that bakers may expect to see many regulatory bills introduced at the coming winter sessions of American legislatures.

How much of this legislation can be guided intelligently by proper cooperation, and how much might be avoided if the Industry could run a little ahead of public expectation instead of lagging a little ways behind it?

The Northwestern Miller handles the question in a way that seems worthy of the attention of every baker. It says in its editorial columns:

## *A Perennial Nuisance*

The preliminary report on the subject of losses from stale bread returns, issued by the Food Research Institute of Stanford University, demonstrates that since the period of war-time regulations there has been a considerable relapse among wholesale bakers to the pernicious custom of pre-war days. Three or four years ago there was good reason to hope that the return of stale bread from retail dealers to wholesale bakers had been definitely and finally eliminated, but to judge from the investigation conducted by the Food Research Institute, more than fifty per cent of the larger bakers are again finding this one item decidedly expensive.

That there is absolutely no need for permitting this nuisance to exist has been amply demonstrated, both by the experience of practically all bakers during the war, and by the practice of many of the wholesale bakers today. In some cases state laws specifically forbid the return of stale bread, but the enforcement of these laws seems to have lacked uniformity. Where no such laws exist, the report states that "competition makes it extremely difficult, though not impossible, for a single baking concern to refuse to accept returns. Agreement of the leading wholesalers not to accept returns may be fairly effective, but cannot always be attained and is not always rigidly lived up to."

### *Economically Unsound*

This concise statement of the situation is undoubtedly accurate, and reflects conditions as they exist in practically every American city. The bakers all know that the acceptance of stale bread returns is economically unsound, and without exception they would gladly be rid of the practice, but if a single wholesale baker doing business in the community is willing to take back his unsold stale bread, all the others feel that competition forces them to do likewise.

What will certainly happen throughout the country if the bakers persist in this custom is that state laws or municipal ordinances will be enacted prohibiting the acceptance of stale bread returns. This will be done, not because the public is in any way interested in protecting the wholesale bakers against the results of their own spinelessness, but because the return of stale bread involves a kind of wastefulness which is contrary to public policy. It was nationally prohibited during the war because it served absolutely no good purpose and meant a serious waste of the basic necessity of human sustenance, and the regulations which were adopted under the stress of war conditions may easily, with minor modifications, be used as the basis for local laws having the same general object in view.

It might appear off-hand that such laws would solve the problem for the bakers, but the solution is really far less desirable and effective than it looks. The bakers already have quite as many legal restrictions to cope with as they want, and every new law or ordinance that sets closer limits to their freedom represents a step in the wrong direction. It has already been found that laws prohibiting the acceptance of stale bread returns are exceedingly difficult of enforcement, and that thus they sometimes actually in-

crease the extent of the evil they purport to overcome.

### *Bakers Should Act*

The only rational and wise way to deal with the situation is for the bakers to eliminate the nuisance themselves, without invoking the aid of special laws to help them. If they can do so by agreement, so much the better; if not, it is the part of wisdom for each wholesale baker to make up his mind that, no matter what follies his competitors may commit, he himself will conduct his business on reasonable lines.

It should require no argument to prove the economic absurdity of accepting returns of unsold stale bread. The practice amounts to giving the retail grocer freedom to overstock himself with fresh bread, basing his orders, not on the probabilities of his sales but on his guess as to their possible maximum. In other words, the retailer is encouraged to indulge in wasteful speculation at the expense of the wholesale baker. Any wholesaler who finds a fascination in speculative activity should at least enjoy the sport of participating in it himself; it is a poor amusement to spend money in order to finance some other man's speculative whims.

Getting rid of the stale bread nuisance is simply a matter of backbone. If the bakers cannot do it for themselves they are likely to find the law attempting to do it for them, with unsatisfactory results in many ways. If for no other reason than to forestall such efforts at further legislation the wholesale bakers should explain to their customers why they will not tolerate a custom which is costly for the baking trade, demoralizing for the retailers, and wasteful of what is, after all, one of the chief forms of the public wealth.



### *From Profits to a Loss*

VERY few bakers who know their costs cut prices below a fair margin of profit. I know of one baker baking over 30,000 loaves per day who found himself in an embarrassing position. He did not know how many loaves he was producing per barrel of flour used. He cut the price and in 60 days called up a friend and said: "Bill, I have lost \$6,000 in two months." Bill replied: "You old fool, didn't you know that would happen before you cut your price. If you knew your business and your costs as I do you never would have cut the price."

When a baker is producing say 280 loaves per barrel and is making say, a fair profit of \$1.50 per barrel of flour used, will you tell me how you can cut your price 1 cent per loaf? If you try it you will receive \$2.80 less per barrel of flour used and this will wipe out all your profit and put you to the bad \$1.30 per barrel. As you did not include depreciation on either plant or machinery in the consideration, you would still be 70 cents to \$1 above your actual loss.

I have found, especially when taking a first inventory for some baker, that he was surprised to find out how much material he had lying around—lard in the cellar, in the refrigerator, in storage in several other places; sugar packed away over the garret, in the stable and back of the garage. It is then that bakers begin to realize the amount of money they have employed uselessly in their business.

We were installing a cost accounting system in a bakery when one of the owners came up on a Saturday evening to remark that Driver No. 6 had turned in \$238, whereas he had never before turned in on a Saturday over \$155. There was a reason. His bread had never been counted out to him before.

JOHN C. McALPINE.

### *Research That Pays*

THE soundest and biggest business men of the United States have joined together to conduct the affairs of the United States Chamber of Commerce. Theirs is the task of keeping Industrial America on the move and shaping policies to win the confidence and respect of all peoples wherever American goods may go.

Important, therefore, is their bulletin to their members telling them of the VALUE OF THE AMERICAN INSTITUTE OF BAKING to the baking industry and the importance of similar Institutes to other industries, where research may result in the throwing of important new light on pressing problems.

"The value of scientific research" says the Chamber's bulletin No. 18, "has never been so fully appreciated. The recent war forced Science to the front, and it is now realized that scientific investigation is a NECESSARY ADJUNCT to efficient operation. The trade association Institute renders service over a much broader field than the individual laboratory and prevents much needless duplication. IT ALSO MAKES IT POSSIBLE FOR THE SMALL plant, financially unable to support an individual laboratory, to profit from the investigations carried on. Altogether about \$35,000,000 is being spent annually by American manufacturers in scientific research.

Here, once again, the U. S. Chamber of Commerce says just what we have constantly to say against one of the worst "bugaboos" in the baking industry. The American Institute should not be FEARED because the "big bakers may control" but should be welcomed because it IS OPEN TO ALL and can be afforded by all whereas every BIG BAKER is amply able to afford, and does afford, his OWN plant.

# The Microscopy of Flour

*What Is Revealed By the Bacteriologist's Microscopes In Bakeries*

By HAROLD TURLEY,

*Bacteriologist, American Institute of Baking*

THE baker has heard much about the chemistry of flours, and the work of the chemist in determining their grade and baking value. Comparatively little has been written about the microscopy of flour and the bacteria and molds in which the chemist has little interest, but which exert a most important influence on the fermentation process and the character of the resulting loaf.

In the chemical examination for the determination of grade, that is, the identification of a patent, straight or a clear, the baker has depended largely upon the methods of the chemist, who applies such determination as ash, pentosans and total fat for this purpose. Nevertheless, while these methods are probably of the highest value, there has recently been developed a microscopic method which is of considerable importance in checking the results of chemical analysis and also possesses the added advantage of being much more rapid. The microscopic method is especially applicable in the examination of self rising flours where mineral salts have been added.

In such cases we have been using a microscopic method for the determination of flour grade that was developed by Keenan and Lyons, U. S. D. A. Bull. 839. A known weight of flour is placed upon the ruled area on a glass slide. Three drops of chloral hydrate are added, a coverglass is placed over the preparation and gently warmed until the flour becomes clear. The preparation is mounted under the low power of the microscope and the bran and hair par-

ticles counted in the twenty-two divisions on the ruled slide. The chloral hydrate with the aid of a gentle application of heat makes the bran and hair particles plainly visible so that they can be counted direct even by the inexperienced. The drawing below shows some bran and hair particles in one of the twenty two areas.

In order to check up the method three samples of flour were sent in by a co-operative laboratory, a patent, a straight and a clear. The bran and hair counts are given as follows:

	BRAN PARTICLES	HAIRS	TOTAL
Patent .....	55	11	66
Straight .....	176	44	220
Clear .....	297	99	396

This method of examination of flours was used in the study on self-rising flours as reported in Baking Technology for June, 1922. This method has been used successfully here in checking up determinations of flour grade made by the Technical and Service Department of the Institute.

Another most important application of the microscope in the examination of flour is in determining whether or not a flour is badly infected with mold, large numbers of bacteria or such harmful organisms as the ones which produce rope.

When a baker finds a musty odor in his flour he immediately knows it is moldy, but a flour may be moldy without it being possible to detect the mold with the naked eye, or by any particular odor or other characteristics.

Moldy flour may originate in three



different ways—flour that was milled from wheat that has stood in the shock during wet weather, by improper handling or treatment before it reaches the baker and by storing flour in a damp place in the bakery.

A mold is a plant that is contented when supplied with proper food, moisture and a suitable temperature for growth. When molds are present in a damp flour food materials are being consumed that should go into the loaf of bread. In addition to food material being lost the condition of the gluten may be altered to such an extent that it influences dough fermentation most unfavorably. The baker should understand that when flour is stored in a damp place that he is not only ruining his flour but making it impossible to produce a saleable loaf. A good example of the results of attempting to use moldy flour came to the attention of Mr. Hall, of our Technical and Service Department. A baker in Georgia had a large quantity of moldy flour and sent samples of the flour to the service laboratory. Chemical examinations showed normal amount of protein, but in the baking test the gluten would not retain the gas, there was no spring in the oven

and a flat soggy loaf resulted. The last letter that Mr. Hall received from the baker stated that he was trying to dispose of his moldy flour for paste making because he was convinced that it would not make good bread.

The examination of flour for molds is not difficult. A large drop of water is placed in the center of a glass slide. A quantity of flour the size of a b b shot is added to and distributed about the drop of water. A coverglass is placed over the preparation and the slide placed upon the stage of the microscope. Using the coarse adjusting screw, move the low power objective of the microscope until it almost touches the coverglass. Now look into the eyepiece and bring the objective away from the coverglass until the preparation comes into view. If strands of colorless or colored thin threads are observed, the flour is infected with mold. While vegetable or animal fibers might be present in a flour, it is easy after a little experience to distinguish them from mold threads or mycelia. Small colored rounded bodies may appear among the threads of mold. These bodies are called spores and serve the same purpose for mold reproduction as the seeds or kernels do for wheat or other plants. One of the most common bread molds *Rhizopus Nigricans*, familiarly known as "whiskers," is largely responsible for mustiness in flour. The drawings below show the difference in appearance of flours free from molds and flours containing mold threads and spores.

One of our Chicago members sent a sample of flour to the bacteriological laboratory. On examination a decided musty odor was noted and found to be due to the mold "whiskers" or *Rhizopus Nigricans*. Many species of mold have been found in samples of flour which have been sent to the laboratory by the baker.



Moldy, Damp-Stored Flour

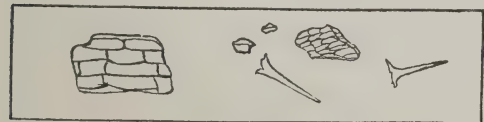
Associated with the molds in flour that has been stored in a damp place are the bacteria. Bacteria are one celled plants that average somewhere around one eighteen thousandth of an inch long. If a flour has a high bacterial content it may be safe to assume that it was due to unfavorable growing conditions of the wheat, improper handling by the miller or poor storage conditions. A method has been recently developed in the bacteriological laboratory of the Institute which makes it possible to estimate the number and kinds of micro-organisms in a given sample of flour. This method will be described in a later publication. The bacteriological analyses on some samples of flour are given below.



Sound, Dry Flour. Note the Absence of Mold Growth and Spores

FLOUR SAMPLE	BACTERIA PER GRAM OF FLOUR
1	2,600,000
2	5,200,000
3	2,452,000
4	1,900,000
5	1,165,000
6	710,000
7	1,260,000
8	770,000
9	350,000
10	2,100,000
11	1,450,000
12	900,000
13	1,100,000
14	365,000
15	320,000
16	250,000
17	310,000

A high grade patent flour is not as apt to be as badly infected with bacteria as a low grade flour. The largest number of bacteria occur on the bran coatings and creases of the wheat kernels.



Bran and Hair Particles in Flour

When a flour is heavily infected with bacteria the condition of the gluten may be changed to such an extent that a soggy loaf results. In 1913 it was stated that in some sections of Germany most of the flour was heavily infected with bacteria. The condition of the gluten was so changed by the excessive content of bacteria that the bakers had great difficulty in making even a moderately good loaf of bread. Most of the heavy infections of bacteria in flours arise from poor storage conditions.

The microscope may be used to advantage in the determination of flour grade, the presence of mold in flour and the number of bacteria in a given weight of flour. The gluten in a flour that has been infected with molds or bacteria may be changed to such an extent that a flat soggy loaf results. Mold and bacterial infection can be held in check by storing the flour in a dry, well ventilated place.

These are but a few of the tests that can be performed with the microscope in the bakery. Further information concerning any test can be had by writing to the American Institute of Baking.



## Books for the Baking Laboratory

**THE LIFE OF PASTEUR.** By René Vallery-Radot. Doubleday, Page & Company, New York. 484 pages.

The life of Pasteur is one every baker should read who wishes to enrich his knowledge of the backgrounds of the Science of Baking. A special reason for reading Pasteur's biography at this time lies in the fact that the French government is officially celebrating the 100th anniversary of his birth on December 27th. The government styles him "the symbol of French science."

So far the baking industry has not singled out any one outstanding figure who is predominant in the invention of baking machinery or the discovery of scientific data of commanding importance. In this field our industry lacks the color of personal romance that Eli Whitney gives to the textile industry and De Laval and Babcock give to the dairy industry.

But to Pasteur we owe the beginning of what baking chemists can now do in the way of fermentation control. The Vallery-Radot biography tells how one of Pasteur's first important discoveries was that of the nature of yeast. Until he announced the discovery that fermentation was due to microscopic organisms the whole world believed that spontaneous generation within the dough itself was responsible.

Not only did eminent members of the medical profession come forward to dispute with Pasteur but Liebig, most esteemed of the chemists of his day, did Pasteur the honor to notice him with severe denunciation. The Academy of Science and the Academy of Medicine both took the matter up and the debate between these two leaders stirred France to its depths in the early sixties of the last century.

To prove his case Liebig attempted to obtain the "mechanical leavening of dough" without the use of yeast. At first one of his disciples seemed to succeed but Pasteur pointed out that the sterile tube in which he had placed his fermentable materials was corked only with an ordinary cork. He demanded that Liebig's disciple use a cotton plug instead, to act as a better filter against the wild yeasts of the air. When the experiment was repeated under these conditions no fermentation took place. Liebig now came forward with a leavener composed of chemicals in which no living organism was involved. The

leavener consisted of bicarbonate of soda and calcium acid phosphate.

Sure enough when these were mixed with the flour and water added, the resulting release of carbon dioxide leavened the dough. Thus Liebig became the father of the "Self Rising Flour" of to-day, and Pasteur became the champion of yeast raised bread.

Chemists, following in Pasteur's footsteps, have isolated strains of yeast and have found the exact "optimum" temperature at which they do best their work of leavening bread. In the meantime "self rising" flours have grown in vogue until the same Pasteur-Liebig issue of which is the more desirable bread still allures the baking chemist and the bread consumer.

When it was all over, and the whole world accepted Pasteur's theory of the bacterial source of ferments, Pasteur journeyed to Liebig's home to shake his hand as a forgiving victor. But Liebig put on a frock coat to meet him and "showed him to the door."

The Pasteur biography shows us in an interesting manner how the modern theory of Sanitation was born out of this controversy and how brewers applied it to keep the wild yeasts of brewery dusts out of their beer vats, long before any Hospital ever thought of air-borne bacteria as a source of hospital infection. Pasteur even carried over from his chemist's laboratory to the medical profession its first introduction to the now standard medical practises of sterilization, vaccination, the control of plagues, the cure of rabies, and the prevention of hospital infections. These vastly important modern practises can almost be called by-products of the Liebig-Pasteur controversy over the nature of yeasts.

In honoring Pasteur the baking industry has to share him with perhaps a greater number of other industries than is the case with any other scientist.

The medical profession consider him such a great surgeon that they have almost forgotten he was a chemist until well along in life, when the discoveries he forced on the medical profession caused his election to the Academy of Medicine. The silk industry honors him for saving it in France through finding and destroying the germ causing a silk worm disease. The

brewing industry honors him, abroad, for giving it the key to control of beer flavors. The Dairy Industry honors him for opening the way to clean and safe milk. And Sanitarians honor him for finding the secret of what makes a safe and reliable water supply.

As laboratory control in bakeries becomes more and more the vogue Pasteur will be honored in our industry, even as he is in many of those closely allied with us.

## Abstracts of Technical Articles

Selected for Baking Technology from *Chemical Abstracts*

**Determination of Total Carbon Dioxide in Baking Powder.** C. S. Robinson. J. Assoc. Official Agr. Chem. 5, 182-91 (1922); cf. C. A. 16, 763.—The Knorr and Heidenhein absorption methods for  $\text{CO}_2$  in baking powders are described and modifications suggested. The high concn. of the acid designated and the time specified for expelling the liberated  $\text{CO}_2$  cause inaccurate results in the Knorr method. The  $\text{HCl}$  should be dild. and aspiration continued longer than the period of cooling. In the Heidenhein method the use of a flowmeter is advised.  $\text{CaCl}_2$  should be placed in the tube where the air enters and where it leaves when soda lime is used for absorption. The gasometric method which requires but one piece of app. and which gives as accurate results as the absorption method is suggested as a substitute for the present official method. The modified absorption method and the gasometric method are given in detail. Dorothy B. Scott.

**Science can make margarine richer than butter.** Casimir Funk. Am. Food J. 17, No. 6, 7-10 (1922).—An address discussing margarine from the vitamin standpoint. Addition of small amount of codliver oil will make the product both antirachitic and antiophthalmic. H. A. Lepper.

**The chemistry of wheat products.** Geo. L. Teller. Natl. Miller 27, No. 7, 38 (1922).—A semipopular discussion of wheat products is given. A table shows the composition of flour, germ and bran from the same wheat and there is also one showing the composition of American wheat, bran and shorts. No one point alone will show the quality of a flour; it is necessary not only to know the gluten and the ash, but also the absorption

and something more about the color of the flour and the quality of the bread made from it. The importance of each of these is discussed. Ruth Buchanan.

**The ash test (for flour) and its value.** S. J. Lawellin. Natl. Miller 27, No. 7, 35-36 (1922).—Equipment and methods of determining ash are discussed. Too much emphasis cannot be placed on the use of a pyrometer with an automatic control for the muffle. The value of the ash test to the miller is in the operation and control of his mill, to assist in making his mill mix, and as an indication of the quality and uniformity of his milling. The baker uses the ash as an indication of the grade of flour. The ash test is of importance, but not in determining the flour quality or value. Its greatest importance, outside of mill control, is when it is supplemented by a complete chemical analyses. R. B.

**The bleaching of flour.** H. E. Weaver. Natl. Miller 27, No. 7, 34 (1922).—A summary is given of the bleaching of flour by means of  $\text{N}_2\text{O}_4$ ,  $\text{Cl}$  and  $\text{NCl}_3$ , both from a legislative and technical standpoint. Ruth Buchanan.

**Keeping bread fresh.** J. Scillis. Natuurwetenschapp. Tijdschr. 4, 54-62 (1922).—S. reports on the work done by J. R. Katz (C. A. 6, 2658; 7, 2073, 3169; 8, 2204; 9, 2275; 10, 1061; 15, 3153). R. Beutner.

**Researches in regard to wheat, flour and bread.** C. E. Saunders, R. W. Nichols and P. R. Cowan. Can. Expt. Farms Bull. 97, 57 pp. (1921).—Results are given of experimental work on methods of milling, baking, tests of baking strength of various wheats, the effect of common ingredients in breadmaking, the effect of storage on wheat and flour, action of bleaching on flour, the use of bread improvers, the effect of smut in flour on the stability of the gluten and the action of the yeast, the best percentage of flour to be extracted from wheat, bread made from gluten flour and some practical and useful hints on household breadmaking. Ruth Buchanan.

**Establishing a laboratory in a food products plant.** Frederic Dannherth. Spice Mill 45, 424, 426, 606, 608, 664, 666, 691 (1922).—A plan of organization is outlined. A summary is given of research reported in 1921 on coffee, tea, spices, flavoring extracts and cocoa. C. W. Trigg.



# New Quality in Odd Loaves

*How the American Institute's Service Department Has Solved Queer Problems for Troubled Bakers*

WHAT would you do if a bread that had been baking out splendidly for you for months, should suddenly develop a droop at the level of the pan top? Or if a double split-top loaf suddenly turned up with a brown streak across it?

The "trouble finders" of the American Institute of Baking have had many loaves to "straighten out" with streaks in them, or saggy sides and have done it for inquiring bakers, merely to help out in the serving of QUALITY bread to the American nation.

One loaf which has just been restored to normal came out of the oven with a large hole at its center. When all else failed the moulder was set in a new position—the tightest adjustment possible to make. Then it was gradually loosened as a few loaves were put through in each new position. The trouble was found to be in a bad adjustment of this machine.

A loaf which caved in at the sides at the level of the tops of pans, was found to have been fermented at too low a temperature and baked in too slow an oven.

When a Louisville baker was informed by wire that his trouble was rope he refused to believe our report. He was familiar with acute cases of rope but not incipient symptoms. But he was finally induced to increase the acidity of his doughs as a protective measure and it cured his trouble.

A bad streak through a loaf turned out to be due to one of four flours used in a blend by a Dallas baker. The offending flour was singled out in baking tests and was removed from the blend. After which the baker could smile and go on

his way rejoicing in the restoration of quality to his product.

Otis Hall, chief of the Service Laboratory, reports that he has examined for trouble a total of 518 samples of flour or baked loaves.

Did you, Mr. Baker have one of your troubles among the group?

The American Bakers Association is organized on the theory that what harms one baker's quality harms the good name of the whole industry and it established the Service Laboratory in our National home to bring an end to Everybaker's troubles, so far as expert aid can solve them.

Mr. Hall has determined for 196 bakers the exact amount of moisture, ash, protein, and gluten in the flours they were using. He has made 1,446 baking tests, for a baking test has been found to be the only way to determine what a flour will make in the final form of a loaf of bread.

Ugly splits at the sides and ends of loaves, for instance, were found on baking tests, to be due to an insufficient amount of water in the mix, in addition to an error in the time at which doughs were punched. This service is here in your own organization at your beck and call, just as the Fire Department is ready for your emergency summons in your well organized community.

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I have been reading Baking Technology and find it very interesting and full of information. I want to congratulate you on the good work you are turning out at the Institute. The two recent bulletins by Drs. Rumsey and Collatz are full of valuable information. CHARLES HOFFMAN,

Chief Chemist, Ward Baking Company.

# BAKING TECHNOLOGY

*A Journal of  
Applied Science  
in Baking*



*Published by  
The American Bakers  
Association*

Vol. I CHICAGO, ILLINOIS, DECEMBER 15th, 1922 No. 12

## Christmas, and All Year'Round

HERE they come—the Christmas shoppers! And here they come—the words of good cheer and fellowship. Christmas is the period for the burying of axes and tomahawks and the laying off of war moves.

Before the members of the baking industry in the Sunburst of Christmas morning, where there is a White Christmas, lie the great fields of service, unexplored. Wherever bread is baked to an accompaniment of backaches for mothers, it means the serving hand of the baker is needed.

Why has it not extended there before? Why are there fifty per cent of our Ameri-

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can people still struggling with the kitchen bread pan when great machines in great bakeries, or small machines in small bakeries could save mothers from this drudgery?

Perhaps in one city bakers became so intent upon the trade they already had that they quarrelled and fought for this trade, and shut every vestige of the Christmasspirit out of their hearts towards one another. These bakers were like the boys who

saw an apple upon the ground, in Henry Stude's famous parable of the wise and unwise little boys. The boys both plunged head-on for the apple and collided with each other. Then they gripped in a fight



and wrestled and tore and clawed each other, until the apple was all jammed down into jelly.

At last they quit fighting and looked up at the apple tree. There they saw apples hanging by the dozen and the hundred, more than enough for all of their desires. As Henry Stude tells this little tale to his baker contemporaries down in Texas he tells it with the obvious moral that they should look widely and not narrowly upon their industry, and should work cooperatively to build up its greatest selling zones, rather than selfishly to tear one another down. It was Henry's way of telling them the Christmas Spirit ruled all the year 'round in their great National home.

Then there is another city, where the baker does not serve the people half so well as he might.

In that city, perhaps, the baker met the Health Inspector with a chip on his shoulder. He turned, perhaps, a "wicked eyebrow" up at Jay Burns when Jay Burns came preaching to him as the apostle of sanitation. He thought evil in his heart against this great apostle of cleanliness. With what sad result?

People just sensed that in that city the bakers were not so clean as they might be. An impulse to do home baking followed a lack of an aroused faith in bakeries. Mrs. Smith told Mrs. Jones at the women's club meeting that she feared bakery conditions, so Mrs. Smith did not thereafter dare to serve bakers' bread when Mrs. Jones was due at her house as a supper guest. In this town bakers had the personal satisfaction of being "off" their National Association, but at the same time they were "off" in their service to the community and promised to remain so for a long time.

What have the members of the baking industry to be thankful for, as the Yule-

tide spirit mellows their hearts at the year's sweetest climax?

Within the industry the good fight was made to break the express rate raises attempted by the express companies in the very face of war raises that had already gone to a perilous figure. Thus the Industry kept the bread line open to the far country districts. They helped to make it possible for Mrs. Farmer to have her bakers' bread and cake, along with Mrs. Broker of Riverside Drive or Michigan Avenue.

The American Bakers Association has to add to our Christmas cheer the sheaf of new memberships, sent into our Association after the first round of the express rate battle had been fought and won. These new memberships were a boon to us because there is nothing makes the feet heavier in the task of running ahead for new Industrial victories, than the fact that all victories fall to the unappreciative, and the non-cooperating, as well as those who shoulder the burden of the fight.

The Christmas spirit is one of cooperation and union. In that spirit American Bakers Association has projected for 1923, a series of fights which will be under the leadership of Eugene H. Hickok, special attorney in charge of the express rate fights. They include a general overhauling of the express rate situation, an appeal to the Tariff Commission on the tariff matters involving bakers' supplies, and the establishment of State Trade Commissions.

"These three issues," writes Mr. Hickok, "will give us a hard year's work. The express companies are now lined up asking for a general increase in express rates. Our victory was in a case involving a special raise on cake."

### *The Tariff Battle*

The Tariff Commission has plenty to do in readjusting bakers' tariff troubles.

Congress hastily jumped the tariff on eggs from 3 cents per pound to 18 cents per pound. Until we obtain a readjustment the baking industry will pay this added cost. Mr. Hickok believes he can induce the Tariff Commission to take jurisdiction and reduce unfair tariff impositions for which the bakers pay. Is there enough of the Christmas Spirit to make the world of Bakerydom want to say in larger volume to him, "Go ahead, we are behind you and with you?"

### *Sales Below Cost*

Bakers all over the country have looked with chagrin, anger and sadness upon the Chain Store or the newly-opened competing store which sells bread below cost to draw trade. Bakers have concluded it was wrong—but what could they do about it? How many of them have ever stopped to consider that by coming into their National association and all working together to make Uncle Samuel see the facts there was a plain road to Ready Relief?

The road is open because Chairman Gaskill of the Federal Trade Commission has laid down the principle, in a speech to the Wholesale Grocers Association, that **"price cutting below the cost of production is unfair competition."** American Bakers Association needs the united help of every baker in the great opportunity it faces to bring an end to the selling of bread below cost. If all of the states had commissions such as the Federal Trade Commission there would be a jurisdictional power that would reach every chain store and every user of bread as a "below-cost leader." The association is working for these State Trade Commissions in every state. Are you, Mr. Baker, doing your part to help the service along?

### *Rotarians to the Fore*

The Baking Industry gained much during 1922 which it will be the business of

the Industry to capitalize and score on in 1923. Here Rotarian bakers will spread our gospel. In the new loaves of richer nutrition that have come out this year the Industry gains an answer to all critics in the home and in the nutritional schools. Mother may have been proud of her baking but she can never say her bread was a complete food. The so-called "superloaf" brought forward by George Ward is said to be a fulfillment of his life's ambition. As such it stands above and apart from a purely commercial achievement. In orphan asylums, in prisons, in reformatories where a restricted diet is the rule, the new loaf is now being tried out. Another year will see it among the accepted breads or will see it ranked as a costly experiment that "did not work out."

At the last convention of the New York State Wholesale Bakers Association many questions were asked about the newer loaves. Mr. Ward made his answer to all inquiries—let the public decide. If it does what it is expected of it, it will bring a rich flow of milk to the mother's breast, whereas she has formerly had to cease nursing her baby or has seen it dwindle and die for lack of nourishment. It will bring color back to the cheeks of little children for whom the poorer mothers have not been able to select the ideally balanced diet. It will insure inmates of homes and prisons against "mistakes" in the restricted diet that heretofore have robbed so many millions of their heritage of health.

### *The Test of Time*

The tests are under way—ours is the privilege in the next year of observing and appraising the results. In the meantime it may be noted that in the cities where the new loaf has been tried, it has not so far cost the sale of a single loaf of white bread. All bakers in such cities



report that their sales went on in uninterrupted form, or increased due to the controversy over bread provoked by the new loaf's arrival. Women who had been afraid of bakers' bread were those who ventured forth to try the new type of it.—those and other women who had suffered from nutritional disorders it was thought the new loaf's assortment of soluble mineral salts might cure.

### *A State Outstrips Nation*

Whole milk loaves, the country over, are the contribution of the bakers to the newer demand for more nutritional food. These loaves are offered from San Francisco clear up to Boston.

And in New York State they propose to go further than even the Federal Government has gone in suggesting bread standards.

They suggest a classification, in a new bill to be introduced at Albany, of "100 per cent Whole Milk Bread." Such bread must not have a bit of water in its mix. "Milk Bread" may contain the usual two-third portion of water in the mix.

Then there is a new classification for "Whole Wheat Bread." It calls for bread made from the entire wheat berry. "Part Whole Wheat Bread" is the name that must accompany all of those mixed breads using whole wheat and white flour both.

These are the advance outposts of Bakerydom's fight for a higher place in current civilization.

### *The Breadstuffs Council*

And there is still another outpost. Wheat farmers, statesmen, bakers, flour men, supplies men, are all interested in increasing the consumption per capita of breadstuffs. National prosperity would be vastly enhanced at each point of gain. In the movement to organize the American Breadstuffs Council, William Francis Ireland, chairman, and John W. Burns,

secretary, have a monumental task cut out for them in 1923. When they have accomplished it we will hear less of whole-sale bakers, retail bakers, pie bakers, cracker bakers, chain store bakers, pastry bakers, Jewish bakers, Polish bakers, pretzel bakers, and all such groups, each one of which may be too intent upon guarding its craft prize and craft resentment of its neighbors in the Breadstuffs Industry. Instead we will hear more of the Bakestuffs Ration of America and the united effort to supply it.

### *As Scientists See Us*

THE art of baking is making its way into chemistry, or perhaps vice versa. For years Dr. Kohman has been working at Mellon Institute, and in 1919 the American Bakers Association organized, with the help of the National Research Council, its Research Institute, first at Minneapolis and later at Chicago. In the October number of The Chemical Bulletin A. W. Landstrom, chemist in charge of the Analytical Laboratories, contributes a descriptive article of the Institute's new establishment. The work is divided into two parts: the scientific and technical, and the educational. In the laboratories research is carried on and tests are made for members. Advanced research is also conducted in co-operation with several universities. The laboratories have published findings on control of rope, studies of molds, strength of flour as affected by enzymes in the flour and those added in malt extracts, relation of strength of flour and the viscosity of dough made from it, and a lot of other subjects.

At the same time a school of baking is conducted in which foremen are trained and the incidence of scientific control is made clear to them. In the research laboratory a number of advanced students

have already completed work which has led to the degree of Ph.D.

When we consider baking in its chemical and biological aspects, the requirements of temperature and humidity as well as the control of materials having such difficult qualities to master as flour, and the manifest complexities of the phenomena that accompany shortening processes, it soon becomes evident that instead of dealing with a craft to be learned by rule of thumb we are facing a great chemical industry.

Our readers may recall an incident we mentioned last winter when a young graduate chemist asked us if we could help him obtain a position in a chemical works in his home town. The company in question was not seeking additional chemists at the time. So we pointed out a large bakery and suggested that he could surely find plenty to do there. "But they don't want a chemist," he said. "That," we replied, "is what gives you your chance. If they knew they needed one, they would get a man of experience; they wouldn't take you. But if you can get a job of any sort there you can find all sorts of opportunities to apply chemistry and make yourself a man of great value to them. They need a chemist, but don't know it. You can take almost any job in the bakery and teach them what they need to know—if you have tact. And if you have patience along with tact, they will probably pay you well for your services. Before long these chances will not be available. Bakers are beginning to learn that they are engaged in chemical industry.

Chemical and Metallurgical Engineering.

### *Glucose for Radiators*

WITH Christmas weather coming on, many a baker is receiving trouble reports from his deliverymen. They put the alco-

hol in the radiators of the delivery cars all right—but something must have happened; the cars freeze up. Perhaps a warm day caused the alcohol to boil out.

How many bakers know that an excellent substitute for alcohol is to be found in the glucose of which nearly every bakery has a supply on hand? It won't boil out, once it is in, and in the spring it can be drained off without the slightest bad effect on either the motor or the rubber hose connections. A pint and a half of glucose to each gallon of water is the proper amount to put in.

In the magazine *SCIENCE*, Dr. Charles H. La Wall, of the Philadelphia College of Pharmacy and Science, explains his experiments with glucose for the automobile radiator:

"For four winters past I have successfully employed commercial glucose with unquestioned efficiency and with no detrimental results whatever.

"I believe that glucose is superior to anti-freezing mixtures containing denatured or wood alcohol, glycerine, or some chemical salt such as calcium chloride.

"The amount necessary is between 15 and 20 per cent or about a pint and a half of glucose to a gallon of water. The glucose may be mixed with enough warm water to completely dissolve it and then added to the remainder of the water in the radiator. No further addition or attention is necessary except to replace the water lost by evaporation.

"In addition to using the mixture practically for four years with satisfactory results I also performed some experiments to determine the congealing point of such a mixture. I found that it begins to get slushy at about 10 degrees above zero Fahrenheit, but that it does not actually freeze and harden even at 6 degrees below zero.



# Two Plates of Mold

*How They Throw A Vivid Light on the Evil of the Return of Stales*

**H**ERE is a story for every baker who ever brought a loaf of moldy bread back from some store, and dropped it into his bakery. The story has a moral for every farmer who ever bought a week's supply of bread at once from a baker, and then complained because at the end of the week there were evidences of mold. The grocer, too, who may leave traces of mold in bread boxes, has also something here to learn.

Harold Turley, microscopist of the American Institute of Baking, was showing a baker certain flora in his vast gardens of mold. To illustrate how universally mold spores existed in the air he pointed to one of the tiny mold "pods." It was just visible to the naked eye. Yet, he explained, the mold plants were so prolific that every one of those tiny pods contained from 500 to 1,000 mold spores or seeds.

These seeds, loosed into the air upon ripening as peas might be from a pod, floated about until they permeated all

aerial dust and were ready to attack any food that they might be able to find. The baker doubted the statement of the universality of mold spore distribution in the air and dust.

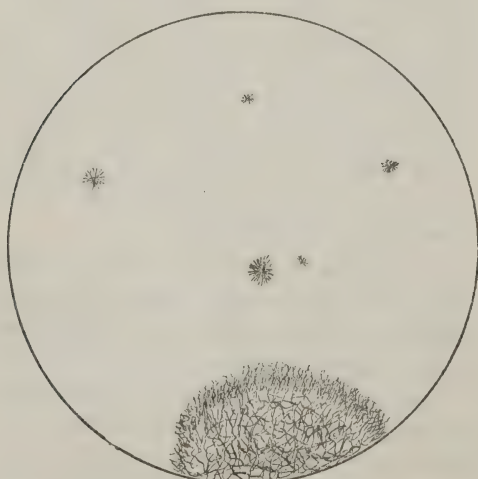
So Mr. Turley performed a little experiment to illustrate the case. Into an ordinary room he walked with a dish containing a food on which molds would grow if mold spores were present. He exposed this dish to the air of the room for one minute. Six tiny cultures of mold growth appeared after a suitable time for germination.

Then a second experiment was performed. Into the room walked Mr. Turley with a loaf of moldy bread. It was just such bread as a baker might throw into a forgotten corner of his bakery. It was just such bread as might grow its own molds in the room set apart for the return of stales.

After he had introduced the loaf of moldy bread, Mr. Turley again exposed a plate containing the agar dextrose potato mixture that serves as nourishment for molds. The exposure this time was for one minute, as in the first experiment.

But what a difference in results! Instead of producing only six little mold colonies the agar mixture produced as many colonies as could find the slightest growing space within the dish. They were so thick, in fact, that the culture dish had the appearance of a piece of sticky fly paper that had caught the very last fly it would hold.

The molds were of several varieties, but the common black mold known as *aspergillus niger* predominated. There were 1,000 colonies on the plate exposed after



Six colonies of mold growth occurring before a loaf of moldy bread had been brought into a bakery room.

a loaf of moldy bread had been brought into the room.

There was of course no contact between the moldy bread and the culture medium. The nearest point that Turley approached the mold bread was six feet away.

It is no wonder, in view of the prolific seeding power of molds, that men from the American Institute's service department look first of all for the moldy bread somewhere in the bakery, when they seek the source of mold in fresh-baked bread. Wrapping papers are sometimes blamed for mold in bakeries when the papers are just the recipient of the stream of mold spores flowing from returned loaves to every part of the baking and wrapping machinery.

In grocery stores bread boxes often become sources of mold infection. Crumbs of bread are left in the boxes. They grow mold and the mold spores pass over to the new loaves, as they are put in the boxes, in enormous volume.

The time has come when Sanitation in the bakery must be followed through to the home and to the grocery store. If both the home bread box and the grocery bread box are kept absolutely free from bread crumbs, clean bread, when it is delivered to them, will remain sound and sweet longer than is the case nowadays.

Here is one of the new points of contact, where the lesson of Turley's mold experiment can be driven home to all having to do with the handling of baked products from the bakery through the grocery to the housewife's pantry shelves.

### *Toast for Breakfast*

WE always knew that a variety of kinds of bread, toasted, make a most appealing breakfast dish in connection with milk, butter, jam, and preserves. But we never knew just why until Prof. E. H. S. Bailey



A thousand mold colonies obtained just after a loaf of moldy bread had been brought into the room.

of the University of Kansas, wrote this paragraph about it:

"When bread is toasted, some of the starch changes to dextrin which is more soluble than starch and also more easily digested, but the proteins are rendered less soluble, and hence slightly less easily digested. Toasting causes the bread to yield more readily to the action of diastase and other ferments and at the same time tends to sterilize the bread and kill those ferments that were not destroyed in the process of baking.

"In order to obtain the best results from the use of toast it should be toasted so that it is crisp throughout. This is obtained in the "rusk" which is put on the market by the large bakers and in the "zwieback" of the Germans. Both of these products are valuable food, especially for dyspeptics as they furnish abundant nutriment which is easily available, and complete mastication is necessary."

My subscription for Baking Technology has been a mighty good investment for me, because of the helpful information it imparts.

—Robert Dewar, Philadelphia, Pa.



### *Baking in Full View*

WHEN "window bakeries" first opened womenfolk had a chance to see luscious loaves of bread coming from the ovens and there was a rush to buy. Window bakeries passed but the added confidence in bakers' bread remained as a permanent increment to the industry.

The "window bakery" idea was seized upon by Jay Burns in Omaha to prove to all passers-by that SANITATION was the watchword of his plant. Now W. E. Long applies it again at Hammond, Indiana. His new plant of the Calumet Baking Co., not only carries on all baking, rounding, molding, proofing and wrapping operations in full view of the public, but a blue-and-white decorative scheme is carried all the way from oven doors to wrappers and on out to delivery wagons and billboards.

"I hope we may have many more new bakery plants as good as that of the Calumet Baking Co.," writes I. L. Miller, Food and Drug Commissioner of the state of Indiana, after a visit of inspection. Commissioner Miller has the duty of protecting the public from unclean, unwholesome bread and he knows that in such a plant his duties are made light indeed. He even found in this bakery an automatic control for the flour room, to keep the flour always at the best temperature for storage and for use in the mixing room, and a steam room in which only dry steam could escape from the pipes to aid in the last stage of dough fermentation. The plant is an achievement in moderate-sized bakery construction, in all points which the housewife, the sanitarian, and the food inspector are likely to be interested in. Any baker who is visiting Chicago should see it.

### *A Cereal Short Course*

THE baking industry can never get behind it, in the flour mills, too many cereal chemists who know all that Science can tell us about the contents of flour storage bins.

For this reason all chemists who are thinking of molding out for themselves careers in the foodstuffs industry will be interested in a short course for cereal chemists to be given at the University farm of the University of Minnesota, January 2 to 5.

The course is not one for beginners but is for students who have completed a university course with chemistry as a major subject. Those who have added some industrial experience to the initial college work are especially desired. This is because some important announcements are to be made.

These announcements will concern recent research of a most important character. The effort will be to translate the research work into language that the industrial chemist can understand and apply in plant operations.

Laboratory exercises will take up the time of the students during each afternoon, while at 4.30 each day there will be a "round table" discussion between students and faculty members. The laboratory work will include:

1. Viscosity measurements of flour suspensions treated in various ways to indicate variations in the hydration-capacity of the gluten proteins.
2. Hydrogen-ion concentration determinations and buffer action of flour grades.
3. Changes in hydrogen-ion concentration of straight and sponge doughs, during fermentation.

4. Electrical conductivity of flour extracts as a measure of flour grade.

The teaching staff includes men who have become known all over the world for the value of their work in cereal chemistry. Among them are Ross A. Gortner, C. H. Bailey, L. S. Palmer, and J. J. Willaman, of the Division of Biochemistry; H. K. Hayes, Plant Breeding; E. C. Stakman, Plant Pathology; R. N. Chapman, Entomology; A. C. Arny, Agronomy.

From men among this group of teachers has come such valuable work in wheat proteins that flour mills base their 1922 wheat buying prices on the protein content of the wheat. There is a basic price to which a certain number of cents per bushel is added or subtracted according to the content of protein. This means the end of the day when a "bushel of wheat is a bushel of wheat" just as bakers must end the day when a "loaf of bread is a loaf of bread" regardless of its quality, flavor, nutritive content, and even size.

### *As to Production Managers*

INTO the baking industry the new element now entering, besides vastly improved machines, is the PRODUCTION MANAGER. More and more the bakery owner is a large corporation, whose head is busy with Rotary Clubs, affairs of his town, and of his state, or with the marketing of his product.

A widely experienced baker said in these headquarters last week that he believed the most profitable bakeries were now owned by people "who were not bakers at all but knew enough to "pick and support and tolerate" good production managers.

It is so easy to play the bully with an employed subordinate that it is really

hard to tolerate the modern production manager. One baker we know of wanted us to send him a good manager. We found he had thirty or more in the past three years and had driven them all off by insisting that each one do things as he learned to do them thirty years ago.

What's the type of man wanted? How does a man who would fit the specifications given below, fill your bill? They are specifications written out for the ideal employee of the DuPont de Nemours Powder Co., by Col. William C. Spruance, a vice-president of the company. He outlined them in a talk to Princeton students:

CO-OPERATIVE. None can succeed alone; success is the sum total of the successes of all the members of any organization minus their failures. Give and take assistance; be willing to help, and open to suggestion; eager to try any new idea or scheme that offers a possible advantage.

RESOURCEFUL. Don't be afraid of difficulties, nor dismayed by temporary setbacks; show backbone and persistence to overcome obstacles.

ECONOMICAL. Guard against waste, be saving of time, effort and materials and suggest more economical methods to your employer.

CAREFUL. Avoid loose methods in the office or on the road, or recklessness in field or mill operations.

COURAGEOUS. Have the courage of your convictions, and give your real opinion when asked, even if it seems to be on the unpopular side. He who sidesteps responsibility reveals unfitness for responsibility.

OBEDIENT. Each employee is a private or officer in an industrial army. By following instructions whole-heartedly and explicitly, you will qualify as an executive.

SYSTEMATIC. United, efficient work is possible only through system. Systematize your own work, study all instructions, and religiously follow the system in effect.

LOYAL. Recognize the mutuality of interest of your employer and yourself.

SINCERE. Flatterers, traducers, tale-bearers, or traitors are not wanted. No criticism of any employee, officer, or competitor is desirable that may not be honestly made face-to-face and for the intended benefit of the accused."



## BAKING TECHNOLOGY

A Monthly Journal devoted to the Advancement of the Baking Industry, publishing the official notices of the American Bakers Association and interpreting for bakers the work of the research laboratories of the American Institute of Baking.

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I. K. RUSSELL, Editor

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Published by the  
AMERICAN INSTITUTE OF BAKING  
1135 Fullerton Ave., Chicago

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Entered in the post-office at Chicago, Illinois, as second-class matter, under the act of August 24, 1912.

Price, Fifty Cents a Number; Five Dollars a Year.

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DECEMBER 15, 1922

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### *Xmas Cheer—and Our Happiness*

LIKE the present, there has never been such a Christmas for the baking industry. Men who two years ago would hardly speak to each other, now march along in unison to find better ways to make a finer loaf.

In the National home of the Industry bakers from Texas, Connecticut, Nebraska, Massachusetts, Washington, New York, and all the states that lie between, come hurrying when President Korn announces that he needs their advice on National policies.

Some of these are men who have built up strong and sturdy state associations at home. There never was a time when National policies were shaped with such an abundance of rich advice and suggestion from bakers of such widely diversified fields.

Active committees under Stritzinger of Pennsylvania, Taggart of Indiana, Livingston of Illinois, Bolser of Minnesota, Stone of Texas, shape each detail of the major tasks of our Industry's National home. They shape the policies of research, of development of young, new bakers in

our School, of public relations, of budget, of Tariff and Express rate fights. The time has long passed when any baker can say any clique or group predominates in our National work.

In New York the State association ends the year by joining as an Association member. At the meeting where this was voted, the association welcomed speeches from George Ament and other guardians of the interests of the retail and neighborhood bakeries. Points of contact were developed where all can work for the common good, and "check their tomahawks" outside the door.

If the Christmas spirit of 1922 can only become the year-round spirit of 1923, the Industry will learn to look upon this year as one of the most important pioneer years in its efforts to marshal its resources of spirit and cooperation.

### *Travelers on the Road*

TO keep a traveler on the road involves a great expense of maintenance these days and only those manufacturers will do it who earnestly believe their product is worthy of close study by the man whom the traveler is sent to visit.

If each baker will say of the salesman who comes to his door, "Here is a man who has traveled far at great cost to show me something or tell me something, and if he could spend his money coming surely I can spend enough time to hear his case," the Industry will probably benefit.

The baker has all the advantage when a stranger comes from without, and he can easily put up a "No Parking" sign, or lift a wicked eyebrow, as his visitor "talks his line." One of the best bakers we know, however, tells us the story of his success is simply a story of listening to machine men and supplies men and always buying the

best of the new machines and the new labor-saving devices offered to him. In this way he grew from a hand-craft baker who peddled his bread in a basket after baking it to be owner of a traveling-oven shop that is the best in his community.

### *The Best of Spirit*

ON November 9 the plant of the City Baking Co., at Grand Rapids burned down. When the Michigan Bakers Convention met a few days later one of its first actions was to send a telegram of fellowship and sympathy to Mr. Scott, the bakery's manager. One baker was not quite happy at the convention. He wanted to get home to see that his own plant was turning out the City Baking Company's product properly and in good time.

Here was real human fellowship. It would have been very easy for other bakers to put solicitors on the routes covered by their crippled associate, but what baker could ever have been happy with increased business won in such an hour?

Here alone was a beautiful lesson in the benefits of association among bakers. Every baker wanted to hold up his head among his associates at the Convention and it was an influence leading every baker towards the best that was in his nature, not the worst. A story that one of them had dealt harshly in Mr. Scott's hour of need would have left this one a sorry figure in the day these bakers came splendidly together at Lansing.

### *Good for Fred Lange*

THE best interests of the baking industry are served nowhere else so splendidly just now as in those corners of it where sectional organizations are being formed.

The latest baker to put his shoulder to the plow in this direction is Fred Lange of the Barker Bakery of Rochester, Minn. Mr. Lange believed that the bakers in his section should organize and instead of taking the will for the deed, he put action behind his belief. He wrote to the National home of the baking industry for facts and when he got them he put them into action, in just the way that J. H. Phipps did at Eau Claire and Robert Teviotdale of Grand Island did in Western Nebraska.

Experience has suggested that in no part of the country are the baking interests so well conserved as in those sections where strong local associations, meeting four times per year, mature issues for the State association, meeting once per year. From such sections it is not difficult for the American Bakers Association to obtain support for causes in which all bakers must work together to win, nor to obtain the services of seasoned veterans for our Board of Governors.

### *Mr. Hildebrand's Task*

NO baker ever grew old to better purpose than Mr. Hildebrand, veteran leader of the Shults Baking Co., of New York. In the ripened years he now carries with such good grace, he has fulfilled his wish to lay aside the burdens of business operation. But these years are for him the years of wisdom in council, when his voice can carry with the weight of a Dean-ship in our industry. New York bakers have elected him to a life position in their new Bakers' Club. He is to iron out differences, bring warring members together, promote good will, and serve as arbiter in all things. How many other states have a Hildebrand to whom all can come in love and trust and friendship when they are heavy-laden with the burden of their work?



# A Million Advertisements

*How They Allure the Home Baker from Her Kitchen by Constant Praise of Bakery Products, Even to Pies*

SOMEDAY when some historian is picking out the greatest men of the era in which we now live the historian may light upon the name of G. Harold Powell as one of the most alluring.

Mr. Powell died suddenly this spring but in the few, young years allotted to him he brought every resource of transportation, manufacture, politics, science, education, advertising, and even statesmanship behind what became the monumental task of his life.

This was to put an orange just around the corner from about every man, woman and child, in America and keep another one rolling into place as soon as the first one was picked up. Responsive to Powell's vision of this task he brought steamship lines into being, ordered freight trains in March for the next November, sent out a corps of educators who taught the grocers that low profit margins meant big profit totals, called Hiram Johnson and the Agricultural Bloc to his help in Congress, and caused California farmers to plant trees enough to grow 28,000 car loads of oranges, whereas they had formerly thought 5,000 cars were more than the market would absorb.

But the great value of Powell's work, of course, was in its spread, once he had charted the field. What he taught orange folk to do others who came after him taught apple growers, raisin growers, milk producers, cotton growers, tobacco growers, and even tomato, potato and grape fruit growers to attempt. Egg producers in turn fell into line.

## *Baking Industry Profits*

As the period of expansion grew the baking industry came directly into line. The baking industry's members must have noted in the local papers, advertisements about raisin bread, raisin pies, and raisin cakes. The raisin people, now organized with headquarters in Fresno, Cal., to duplicate the work done by G. Harold Powell for the or-

ange people, with headquarters in Los Angeles, are demonstrating by bill boards that stare you in the face wherever you look, that they indeed are spending the \$2,500,000 they said they were to market their 1922 raisin crop.

Until whole crops of food came under one management huge selling campaigns like this were impossible. Before advertisements were written the organized rai-

## Saves Home Baking

Ask for luscious raisin pie—fresh and juicy—at your grocer's or a neighborhood bake shop. Just telephone for one to try.

Once taste it and you'll agree that there's no longer any need to bake at home.

Serve tonight for dinner. Let your men folks decide.

Made with delicious

## Sun-Maid Raisins

Had YOUR Iron Today?

(Sample of a "Boost-the-baker" ad.)

sin industry's managers got in touch with the organized baking industry's management and were convinced from the experiences we were able to detail to them that the wise thing was to urge housewives to buy bakers' raisin bread, not to try to home-bake raisin bread for themselves.

We showed them for instance, letters from a large yeast plant that cut down its yeast manufacture for bakers near Hot Cross Bun day in order to flood the retail stores with yeast packages for home use. The company expected that home-made Hot Cross Buns would absorb this domestic supply of yeast as they always had before. The company however experienced a rude shock this year. Bakers demanded more yeast than ever before and the home-bakers much less. Even the Hot Cross Bun business had gone over to the quantity producer.

We were also able to show them that flour mills were taking a new attitude towards the home baker, based on her passing from the home, and were considering an advertisement of bakers' bread instead of flour, to push up flour sales to bakers.

The result was magnificent. Thousands of bill boards carried pictures of attractive loaves of bakers' bread—inviting and tasty in appearance, and the baker received as much of a benefit as the raisin people. This splendid cooperation is now alluring the butter folk and the milk folk, as they find their advertising "registers" more with attractive toast slices in the milk, or bread on which the butter is being "thickly spread." Glance at the advertisement in the center of this page. See how it "registers" the idea of bakery products, even in pies, the pride of the home-baker's heart.

### *A Sad Baker Made Happy*

SOMEWHERE out in North Dakota there is a happy baker to-day. He is making a beautifully crusted, full-volumed bread where only last week he was making a pale, straw-colored loaf with the top split away from the sides, and wrinkles running every which way across it.

This baker sent in his sickly looking loaf to our Service Department and asked what on earth could be the matter. Otis Hall of the Service Department took the sad loaf over.

"Regulate your oven" he wired right back to the baker, "the top heat is shy, and the bottom heat bakes the bottom of the loaf while the top still goes on fermenting. That's what pulls your top away from the sides."

Then the texture was examined. It was found to be very bad, and a glance at the formula showed a simple reason for this. The baker was using 137 pounds of water in a flour mix that called for at least 151 pounds of water.

"Your bread is away short on absorption" wrote Mr. Hall, "add at least 15 pounds of water to your next mix."

By return mail came two loaves of bread. They no more resembled the old loaves than a fine hat resembles a battered old straw. The baker's letter that came with the loaves was a splendid example of how happy a baker can be when his bread comes out right.

The first loaves that came in were scored 69½ points. The second lot, at 81 points. Mr. Hall sent further advice. He declared that the baker's ingredients entitled him to produce bread scoring above 90 and he proposed to see that the bread reached this score before he dropped the case.



# Adding Milk for Bread Quality

*How it Increases the Nutritive Value of the Modern Loaf*

By WASHINGTON PLATT

**B**EFORE a conference of cracker bakers, Washington Platt, a splendid young chemist who has peeled as many ovens as he has examined test tubes in his laboratory, spoke with intimate knowledge of both chemistry and the bakers' problems, of the political and social outlook ahead.

He predicted another American crusade, similar to the Harvey Wiley crusade that terminated in the passing of the Pure Food Law in 1906. Only the crusade this time, he predicted, would be based on the NUTRITIONAL quality of food rather than on its PURITY from a sanitary standpoint.

Mr. Platt's speech interested us because, for one thing, he could tell just how much more backache a baker got from peeling his fifth oven straight hand running than he got from peeling the fourth. And he was a scientist who could tell this from personal observation. His prediction seemed to be spoken surely in its time, for there came to the National home of the baking industry within the next months many attacks on many American foods.

White bread was under fire for a full share of these attacks. Since the addition of milk to the bread mix makes the quickest known route towards a more perfect and complete food, in the form of a bread loaf, many bakers have exhibited a new interest in milk-made loaves. Several large bakers have advertised full-milk loaves to meet the demand that is also being met by the Ward vitamin loaves brought out as a result of laboratory re-

search, checked up in various university laboratories.

We asked Washington Platt to write for us a statement of the practical problems connected with the use of milk in bread. The article below is his answer to our request.

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There is no more inspiring study in human achievement than the story of milk production. This story is a credit to modern civilization. In the production of milk, the scientist, the farmer and the business man have co-operated. The result of their co-operation is shown in the elimination of a large amount of the formerly enormous waste, the better and more general distribution of milk and a tremendous improvement in the quality and cleanliness of the product.

While a picture of this kind is a very pleasing one to gaze upon, it does not immediately concern the practical baker. What the baker wants to know is: What is milk? What good will it do me in my products? How can I select the best milk for my business?

These are the questions which we will touch on in this article.

An experiment station has been wittily defined as a place where "they find out what everyone already knows, and explain it in terms which no one can understand." Many technical articles have come dangerously near resembling this definition of an experiment station.

Let us first consider the composition of milk. If we examine an egg, we see at once that it is composed of several entirely different ingredients, such as a

shell, egg white and yolk. Most of us know that these can in turn be further sub-divided. We know, for example, that the yolk contains a form of fat and that a large part of the contents of the egg is water. It is not always so well understood that milk likewise consists of a number of entirely different ingredients.

Like eggs, milk contains a large amount of water. It is in fact, about 88% water. The remaining 12%, which constitutes the valuable part of the milk, is known under the general term of milk solids. The solids constitute the part of the milk in which the baker is interested, as most bakers can obtain the water more easily from other sources.

The first constituent of the milk solids which will occur to anyone, is the butterfat, which partly separates from the milk in the form of cream, on standing. Pound for pound, this is the most valuable part of the milk. There is no known ingredient which will give such a delicate and delicious taste to baked products as this same butterfat. It exists in the milk in the form of minute droplets, forming a partial emulsion. This is the most advan-

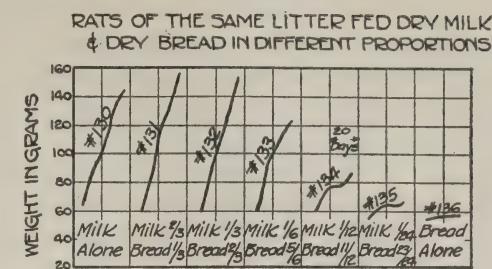


Fig. 2. The effect of feeding different mixtures of dried whole milk and dried white bread. On bread and milk the test animals thrived best. Compare with Fig. 1, showing similar results as between milk-mixed bread and water-mixed bread. (From the *Journal of Biological Chemistry*, as quoted in Sherman and Smith's "Vitamin Manual.")

tageous form in which fat can occur in a bread dough.

### Constituents of Milk

Taking round numbers for the sake of ease in remembering, the solids of whole milk have the following composition.

Butterfat .....	28%
Casein .....	21%
Albumen .....	5%
Milk Sugar .....	38%
Ash (Salts) .....	6%
Moisture .....	2%

In baking, all of these ingredients add weight to the dough and all of them hold moisture. For this reason, when a dough is made with milk, it will take more wetting than when made without. The loaves will show less loss on baking and they will stay fresh longer than bread made with water only. The various constituents of the milk solids also improve the texture of the loaf, making it more soft and silky. The butterfat is the greatest influence on the flavor, but the other constituents all have a beneficial effect on the flavor of bread. This is shown by the improved taste of bread made with skimmed milk, as compared with bread made with water.

In addition to improving the taste and appearance of bread and increasing the

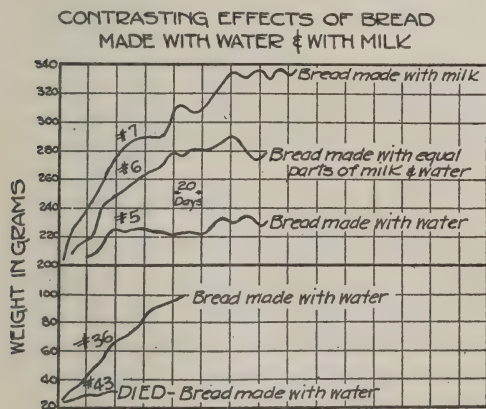


Fig. 1. Weight curves showing marked difference in nutritive value of bread made with and without milk. Test animals grew rapidly on milk bread but languished on water-mixed white bread. (From the *Journal of Biological Chemistry*, as quoted in Sherman and Smith's "Vitamin Manual.")



yield, the use of milk has another important effect upon the bread in which it is used, namely, the milk very largely improves the nutritive value of bread. At first glance, this may not seem to be a question of direct importance to the baker. The more progressive bakers, however, will look upon this in a different way.

### *Milk vs Water Mix*

The facts are that bread is a good and easily digested food which forms a large part of the diet of the American people. It is also a fact that white bread made with water lacks certain constituents which prevent it from standing in the first rank, considered from the standpoint of nutrition. Such bread lacks, specifically, adequate protein, inorganic salts and vitamins. These are the very constituents in which milk is especially rich, so that bread made with a liberal quantity of milk has these deficiencies repaired. Milk bread is an article of food of great nutritive value. This fact has been proved by chemical analyses and by careful feeding experiments conducted by many of America's leading universities. An interesting

article on this subject was published in "Baking Technology" for October, 1922. Several articles may be seen these days in almost any popular magazine.

The public is interested in nutrition. Milk is one of the most nutritious foods known to man. The steadily increasing demand for milk bread has led a few bakers to label their products "Milk Bread" without putting any considerable amount of milk into their product. This situation has caused the Federal Government to adopt definite standards for making bread. According to these proposed new government standards: "Milk bread is the bread obtained by baking a wheat bread dough in which not less than one-third of the water ingredient has been replaced by milk or the constituents of milk solids in proportions normal for whole milk. It conforms to the moisture limitation for wheat bread." As one barrel of flour takes about 120 pounds ( $14\frac{1}{2}$  gal.) water, this means that to make Milk Bread which will conform to this new Government Standard, a baker must use either 40 pounds ( $4\frac{3}{4}$  gal.) liquid whole milk or  $4\frac{3}{4}$  pounds powdered whole milk or equivalent amounts of milk solids in other forms. Another point of importance is that in all cases, whole milk (i. e. unskimmed) must be used. No amount of skimmed or partially skimmed milk in any form, will fulfill these new standards.

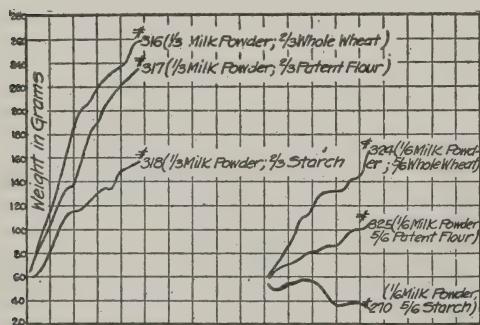


Fig. 3. Effect of liberal portion of milk fed with whole wheat, then with patent flour, not baked into bread, and with starch. The test animals fed on whole wheat and milk thrived best and reproduced their young. Those on patent flour and milk grew well but could not support normal reproduction nor suckle their young. (From a report by Sherman, Rouse, Allen and Woods, 1921, as quoted in Sherman and Smith's "Vitamin Manual.")

### *Choice of Milk Products*

In the choice of milk products, the baker has liquid milk, condensed milk and powdered milk to choose from. In selecting and purchasing any milk product, the following points should always be considered and specified in the order or contract.

A. Is the milk whole milk, partly skimmed or skimmed?

B. How much of the milk is milk solids and how much is water?

C. Is the product clean and soluble? This can best be shown by the use of a simple sediment tester.

D. Is the product free from sourness and rancidity?

Liquid milk, condensed milk and powdered milk can all be produced and handled in such a way that they can be delivered to the baker clean and sweet, with all of their original constituents and properties unimpaired. It is also a fact that milk is a very delicate product,—easily injured,—so that there are many forms of liquid, condensed and powdered milk delivered to bakers which are not of the highest quality. In the choice of milk, as in the choice of his other ingredients, the baker must use intelligence and care, to distinguish the good from the bad.

Mark Twain said "There is nothing in life so difficult as to pick out a good cat. This is not so much because cats are so scarce, as because they are so plentiful." For the same reason, it is sometimes difficult for the baker to pick out a good milk, and it always takes considerable thought and figuring to pick out the most suitable milk for his purpose.

The following points should be especially considered in the case of the three principal forms in which milk is used by the baker.

### *Liquid Milk*

**Special points to be watched.** Temperature, freshness, acidity.

**Disadvantages and Advantages of Milk in this Form.** Necessity of securing a fresh supply daily. Need of cold storage. Keeping quality limited to one day. Variations in acidity. Loss from souring.

Ingredients present in full strength unimpaired by heat. Freshness of taste.

### *Sweetened Condensed Milk*

**Special Points to be watched.** Odor and taste. Content of added sugar. Lumpiness or graininess. Destruction of overheating.

**Disadvantages and Advantages of Milk in this Form.** Added sugar. Stickiness. Attraction to flies. Losses by sticking to utensils.

Great keeping qualities. Ease of solution.

### *Powdered Milk*

**Special Points to be watched.** Freshness, presence of insoluble residue from over heating during drying. Lumpiness.

**Disadvantages and Advantages of Milk in this form.** Necessity for beating to dissolve. Keeping quality limited to 2 to 6 months after reaching the bakery.

Economy in storage and handling. Convenience. Cleanliness. Uniformity. Freedom from added ingredients. Taste.

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## *A Confidential Bulletin*

YOUR bulletin No. 2 came in very handy. We were caught short last Saturday and decided to try lactic acid bread. We ran a straight dough using the same formula as your 15 minute dough with the exception that we ran 54 cc. per bbl. of flour. It was excellent bread.

J. E. PHIPPS,  
Eau Claire Baking Co.

These bulletins are sent out to members only because too many bakers have found an excuse rather than a reason for neglecting to sign a membership blank in the American Association. For those carrying the burden of research it is a very discouraging task to spread what they find out all around for those who delight in "standing out from under" the load as well as those united for a better baking industry.



# Homogenizer an Improvement

## *Report of Experiments Conducted at the American Institute of Baking*

By A. W. LANDSTRUM

RECENTLY much interest has been shown in the homogenization of ingredients of bread. Bakers Weekly publishes the results of experiments performed in the laboratory on small doughs using "emulsified" or "homogenized" materials. The present work has had as its object the further study of this process as applied to baking, determined on a semi-commercial scale. The homogenizer is not a new invention—it has been successfully used for years in the creamery and in ice cream manufacture. Its application to baking is however new, dating back only about a year to the experiments referred to above. Since that time several commercial installations have been made but no accurate data regarding these have come to our attention.

The process is an attempt at obtaining a more uniform admixture of the shortening used in a dough throughout its mass. The mixture produced by the "homogenizer" has been popularly referred to as an emulsion. As a matter of fact it is a true emulsion at ordinary temperatures only in cases where the shortening used is itself a liquid under these conditions, since by definition an emulsion consists of one liquid dispersed or finely divided and uniformly distributed throughout another liquid; a true emulsion would be produced, say, if an oil such as cotton seed oil were used. When a shortening, solid at ordinary temperatures, is used, a suspension results as the finely divided particles of shortening are in reality in a solid state. Whether there exists a real difference detectable by

practical observations between suspension and true emulsions of shortening and other baking materials is a matter for further study. Since the shortening used in this study was solid at room temperature we are in the present discussion dealing with suspensions and not emulsions.

Various claims have been made for the process and in the previous work referred to from which we quote directly we find that the results of these early experiments showed:

1. "That from 1 to 2 percent greater absorption was obtained with the emulsion dough."
2. "That the dough in which emulsion was used, as a rule, developed greater volume in the same period of time."
3. "That the dough containing the emulsion as a rule, came to a greater volume in the oven, it produced bread having somewhat better symmetry, better color of crust, better grain, texture, color and crumb and keeping quality."
4. —"and from the work carried on so far we have observed that the emulsion loaf carries from 1 to 1½ percent more moisture."

In this work we have attempted to determine how many of the above observations could be confirmed under practical conditions. The experiments were made using 150 pounds of flour and three different absorptions; the normal as determined in the usual way, the normal plus 2.5 percent and 5.0 percent water respectively. Doughs were run using homogenized ma-

terials and checked by control doughs run under conditions as nearly alike as could be obtained in practice. The formula used is in the case of the normal absorption doughs practically the same as an all milk formula.

### *Equipment Used*

The machinery and equipment used was part of that of the American Institute School of Baking and consisted of:—

A "Progress" homogenizer manufactured by the Davis Watkins Dairyman's Machinery Mfg. Co.; a "New Era" medium speed  $1\frac{1}{2}$  bbl. mixer; troughs, racks and steam proofer manufactured by the Union Steel Products Co.; an "American" two pocket divider; a "Union" rounder and overhead proofer; a "Champion" moulder; and pans made by the Edward Katzinger Co., and the Lockwood Mfg. Co. The oven used was a "Dührkop" 250 loaf capacity, supplied with steam from a "Freymarek" generator. Oven temperatures were obtained with three "Tycos" pyrometers set in different parts of the oven. Dough and room temperatures and humidities were determined with "Tycos" instruments also.

### *Formulae Used in Per Cent*

Dough No.	6 & 7	8 & 10	9 & 11
Flour (Mother Hubbard)....	100	100	100
Sugar .....	2	2	2
Salt .....	1.75	1.75	1.75
Yeast .....	3	3	3
Water .....	61.0	63.5	66.0
Shortening (M. F. B.).....	2	2	2
Whole Milk Powder.....	7.9	7.9	7.9
Malt Extract (Diamalt)....	1	1	1
Yeast Food (Arkady).....	.25	.25	.25

### *Making of Emulsions*

One fourth of the water necessary for a complete formula was put into the agitating tank of the homogenizer with the milk powder, malt extract, and sugar and agitated until a homogenous mixture resulted, meanwhile bringing the tempera-

ture to about 100° F. The shortening was added and agitation continued until this had melted. The mixture was then run through the homogenizer at a pressure of 1800-2000 pounds per square inch, cooled and stored for use next morning.

### *Mixing Procedure*

#### **A. Control Doughs—No. 6-10-11.**

The salt, sugar, malt and milk powder were dumped into the mixer, the water with the exception of enough to break up the yeast, was then added and the mixer run until a fairly uniform mixture was obtained. This usually took four minutes. The flour was then added. After a partial wetting of the flour by the water the Arkady was added to the yeast suspension and this dumped into the mixer. After mixing for twenty minutes the shortening was added and mixing continued for ten minutes longer.

#### **B. Homogenized Doughs, No. 7-8-9.**

The salt was put into the mixer with the water called for by the formula, taking into account that in the emulsion, and leaving a small amount out for breaking up the yeast. The mixer was run long enough to dissolve the salt, and the flour added. After about two minutes the emulsion was added and the Arkady and yeast. The total time of mixing was thirty minutes as before.

### *Details of Experiment*

The temperature of the dough was then obtained and the dough dumped into a tared trough to determine its weight and the mixing loss. It was then allowed to ferment, the time on punches on an average being somewhat as follows:

1st Punch.....	1 hr. 15 min.
2nd Punch.....	45 min.
To Bench.....	15 min.

The temperature and humidity of the mixing room, the fermentation room and



shop were noted as well as the temperature of the dough at each punch. To determine the fermentation loss and the loss by evaporation during fermentation the dough was again weighed before it was put into the divider. Samples for moisture determination were withdrawn from the dough out of the mixer and as it went to the machines. The weight of dusting flour used was determined and corrections made in calculating oven losses and yields for this and the samples withdrawn for analysis. The weight of scrap dough was also carefully determined and an allowance made for this. Loaves were scaled at  $18\frac{1}{2}$  oz. The temperature of the proof box and oven were determined and the length of the proof and baking also noted. Steam under 35 pounds per square inch pressure was used in baking. It was turned on 5 minutes before loading and left on one minute after loading. The bread was weighed immediately after being taken from the oven, after one hour and after 24 hours. When the bread was one hour old 10 loaves were taken at random for the determination of volume. At the same time 10 additional loaves were taken for scoring, the determination of keeping quality, the determination of comparative weight losses on storing wrapped for several days, and moisture content.

### *Determinations and Analyses*

The moisture content of all of the ingredients used was determined using in general the methods of analysis of the Association of Official Agricultural Chemist.

The Moisture content of doughs and bread were determined by the standard procedure of the Institute, as follows:—

Ten grams dough are weighed into a shallow metal dish 2-3 inches in diameter and about  $\frac{1}{4}$  inch in height. The dough is spread evenly over the surface of the dish with the wetted finger and

"puffed" in a hot oven for about 10 minutes. It is then sliced and pierced with a sharp knife so that moisture can escape readily and dried to constant weight in a vacuum oven at  $100^{\circ}$  C. About 12 to 16 hours heating are necessary. Determinations are made in triplicate.

### *Moisture in Bread*

Two loaves of bread are weighed one hour out of the oven and again at the end of 24 hours. They are then sliced and the slices are spread on paper to dry. The slices are then weighed and ground. Residual moisture is determined on the ground sample by drying 5 grams for 5 hours in a vacuum oven at  $100^{\circ}$  C. From the results of these two sets of determinations the moisture content of the original loaf was calculated.

### *Volume of Loaf*

A volume machine consisting of two funnels, one large enough to hold a loaf of bread was used. Flax seed was used and the apparatus standardized by determining the volume of a box of known dimensions, practically the same size as a loaf of bread. Consistent results were obtained with the box, but duplicate determinations of volume of a loaf were not so satisfactory; variations of 20-30 c.c. being common.

### *Scoring*

Bread was scored by two members of the Institute Staff using the American Institute of Baking Score Card. The score for volume was obtained by penalizing one point for each 100 c.c. volume below 1,800 c.c.

### *Calculations*

The fermentation loss was calculated by dividing the difference in weight of the dough "out of the mixer" and the weight of the dough "to bench" corrected for the dusting flour used on the punches and the sample taken for analysis "out of the mixer," by the weight of dough "out of the mixer." The corrected weight of dough to oven was obtained by correcting the weight of dough "to the bench" for the dusting flour used in the machines, the scrap dough, and the weight of sample taken for analysis as the dough went to the bench. The loss in weight due to fermentation and evaporation of the dough during the time it was going through the

machine and proof was neglected. Retention factors were calculated by dividing the weight of bread one hour out of the oven by the weight of dough "out of the mixer" corrected for the samples taken for analysis, scrap dough, and dusting

flour used on punches and through the machine. The theoretical retention factor was obtained by subtracting from the determined retention factor on dough No. 6. The per cent of water added over the normal absorption divided by the total

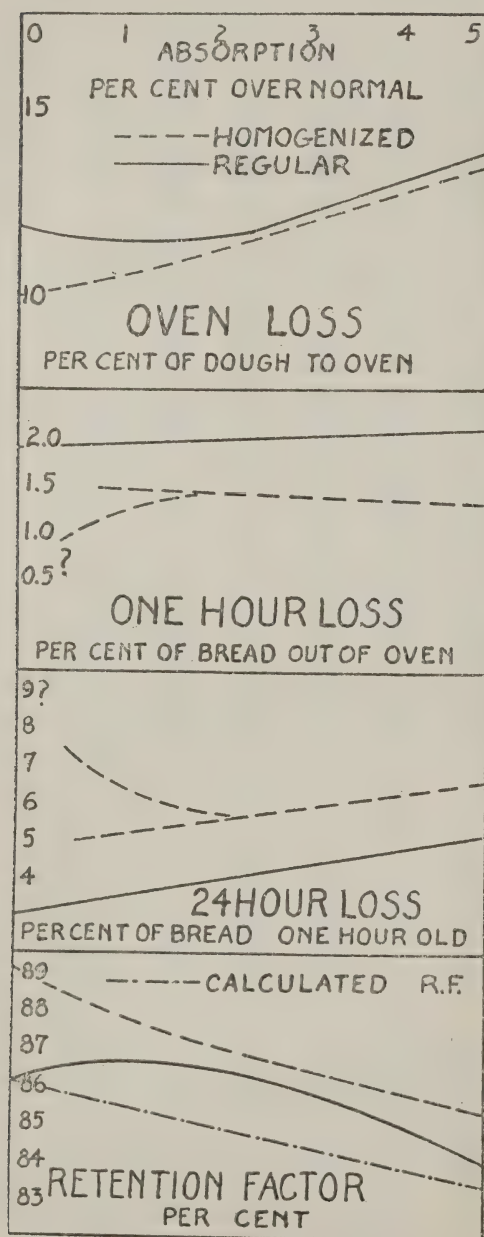
### Tabulation of Results

Dough Number	6	7	8	9	10	11
Absorption .....	61	61	63.5	66	63.5	66
Per cent H <sub>2</sub> O dough "out of mixer".....	41.46	40.91	42.32	43.54	41.99	42.75
Fermentation room conditions temp. average	77°	78°	82°	79°	78°	79°
Fermentation room conditions humidity aver.	49%	45%	46%	48%	44%	43%
Temp. dough out of mixer.....	81°	80°	82½°	80°	81°	82°
Temp. dough average during ferment. period.	81°	80°	83°—	80°	81°+	82°
Fermentation loss per cent.....	0.57	0.64	0.58	0.22?	0.59	0.57
Fermentation period minutes.....	135	145	117	145	147	133
Average H <sub>2</sub> O content of dough to bench.....	41.25	41.57	42.51	44.13	42.58	43.20
Temp. shop .....		82°	84°	80°	81°	82°+
Humidity shop .....		45%	41%	44%	33%	35%
Temp. proof box—average.....	87°	87°	86°	86°	84°	84°
Time of proof minutes.....	38	46	50	46	50	48
Temp. of oven.....	480°	490°	462°	477°	487°	480°
Time of baking—minute.....	45	46	50	50	40	50
Oven loss, per cent.....	11.8	10.0	11.5	13.6	11.6	13.8
One hour loss, per cent.....	1.9	0.53?	1.4	1.3	2.0	2.1
24 hour loss, per cent.....	3.0	9.5?	5.7	6.7	4.2	5.1
Number of loaves.....	226	224	232	230	229	233
Average weight of loaves one hour old, lb. ..	1.01+	1.05	1.01—	1.02+	1.02—	0.99+
Average H <sub>2</sub> O content of bread one hour old..	33.32	33.25	34.32	35.43	34.49	33.28
Average volume of loaves in c.c.....	1535	1630	1677	1749	1656	1775
Average volume—c.c. per lb. of bread 1 hr. old.	1515	1553	1663	1710	1625	1790
Retention factor, per cent.....	86.1	89.1	86.8	85.3	86.3	84.0
Calculated retention factor, per cent.....	86.1	86.1	84.7	83.4	84.7	83.4
Lb. of bread per 196 lb. bbl. of flour.....	296lb.	306 lb.	303 lb.	302 lb.	303 lb.	299 lb.
Score of bread:						
Volume .....	7½	8½	9	9½	8½	10
Color of crust .....	7½	7½	8	8	8	8
Symmetry of form.....	3	3	3	3	3	3
Evenness of bake.....	3	3	3	2½	2½	3
Character of crust.....	2½	2½	3	3	3	3
Break and shred.....	1½	1½	2½	2½	1½	1½
External Total .....	25	26	28½	28½	26½	28½
Grain .....	7	8	8	8½	7½	6½
Color of crumb.....	7	8½	7	9	8½	8
Flavor .....	13	13½	14	14	14	14
Taste .....	18	18½	18½	19½	19½	19½
Texture .....	12	13½	13	13	12½	12
Internal Total .....	57	62	60½	64	62	60
Total Score .....	82	88	89	92½	88½	88½



per cent of any formula. This was calculated for comparative purposes on the assumption that all water over the normal absorption, added to a dough would be lost in the process of bread making. The yield per barrel was calculated by multiplying the weight of bread one hour out

of the oven by the fraction—196 divided by the actual weight of flour used in any case. This weight was determined by taking into account in addition to the weight of flour originally used the dusting flour used and the flour calculated in the samples withdrawn for analysis, and the scrap. Oven losses are calculated from the difference in weight of the bread “out of the oven” and the corrected weight of dough to the oven, expressed as per cent of this corrected weight. The one hour loss is obtained from the difference in weight between the bread “out of the oven” and one hour old, expressed as per cent of the weight of bread “out of the oven.” Twenty-four hour loss is expressed as per cent of the weight of bread one hour old. Results are tabulated in an accompanying chart.



### Analysis of Materials

Material	Per cent moisture
Flour .....	10.98
Sugar .....	0.07
Salt .....	0.19
Yeast (Average of all experiments).....	66.43
Shortening .....	0.04
Milk Powder .....	3.39
Malt Extract .....	22.45
Arkady .....	8.14
"Emulsion" .....	55.42

### Discussion of Results

The results of this work have, in general, confirmed the statements of earlier workers (1) that the absorption of a flour is increased by the use of emulsified ingredients.

The resulting increased yield is, however, variable and the work done to date does not warrant the general statement that absorption is increased by the use of this process beyond the limits of our experimental conditions.

A rather paradoxical situation was encountered in that throughout, the

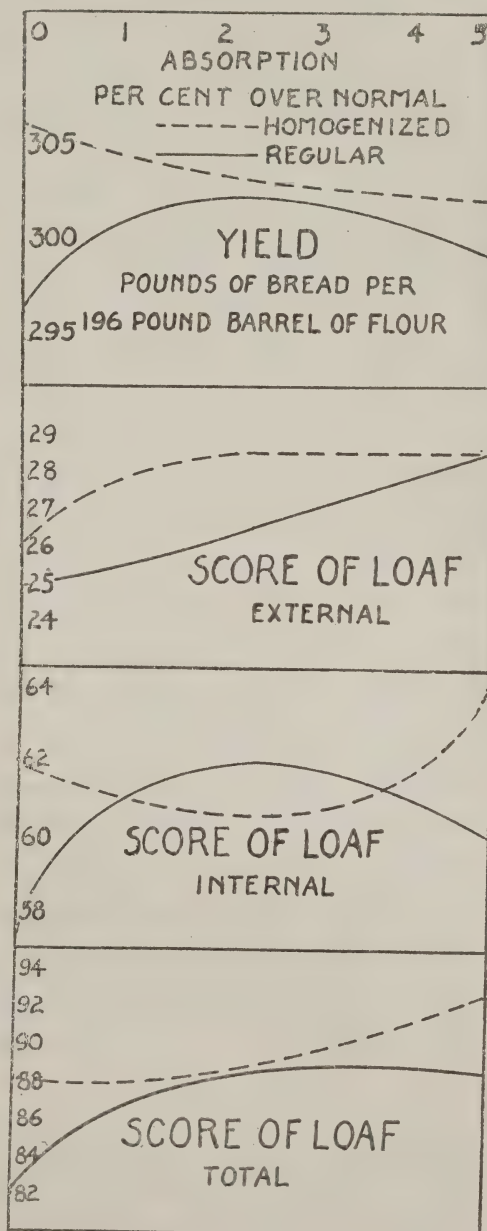
doughs made with emulsified ingredients were more slack out of the mixer than the control doughs but tightened up during fermentation to the same consistency as the controls and further yielded a greater weight of bread per bbl. of flour.

This is after all only a logical result if we consider that the finely divided particles of shortening uniformly suspended in the water can readily come in contact with the granules of flour and so prevent the immediate contact of these with the water where as in the control doughs the flour is given  $\frac{2}{3}$  of the mixing time in contact with water alone.

Slight variations in yeast strength and temperatures of doughs make it impossible to draw any conclusions as to the effect of homogenization on the time of fermentation. It seems from the above data however that this factor is little affected. The differences between the fermentation losses on doughs in which homogenized materials were used and those prepared in the usual manner were so slight that again nothing definite is indicated.

The data show definitely that homogenization decreases baking losses—i. e. losses of water and other volatile substances in the oven due no doubt to the fineness of division of the particles of shortening and their resulting more uniform distribution in the dough. The yields of bread weighed one hour out of the oven are correspondingly increased. This decreased oven loss and increased yield is most evident at the normal absorption of the flour, a difference of ten pounds being noted here while in doughs containing 2.5 and 5 per cent more water than the normal this difference drops to one and three pounds respectively. It is significant that the difference between the retention factor determined experimentally on "homogenized" doughs and that calculated on

the assumption that all water added above the normal absorption of the flour would bake out is very nearly constant on the three sets of experiments performed—while for "non-homogenized" doughs this varies. This is a possible indication that as far as yields are concerned homogeni-





zation tends toward producing more uniform and reproducible results. The above data show further that homogenization produces bread which scores higher, the chief difference found being in the better grain and texture of the loaf.

The volume of "homogenized" bread in general showed an increase over that made by the usual procedure, and a better break and shred, giving a loaf somewhat more attractive in external appearance. The color of the crumb was in general better. No increase in flavor or taste was observed although during mixing those doughs containing homogenized materials smelled more strongly of malt than the control doughs. It was difficult to determine any increased keeping quality of the bread since bread baked from the control doughs was excellent in this respect. Possibly with a formula containing smaller amounts of whole milk the effect on keeping quality of the finely divided fat of the emulsion would have been more pronounced. A preliminary study was made to determine weight losses of wrapped bread both from homogenized and control doughs. The results obtained are not considered representative and this work will be repeated under more carefully controlled conditions.

Moisture determinations on finished loaves do not agree with the data obtained on yields. Since it is very difficult to pick two representative loaves from a batch of about 230 we believe these moisture data should be given relatively less weight than the data on yields. We have therefore neglected the former in drawing our conclusions.

### Conclusions

Keeping in mind the limitations of the above experiments we can draw the following conclusions from the data obtained:

Homogenization has no noticeable effect on—

1. The fermentation period of a dough.
2. The loss in weight of a dough during fermentation.
3. The time necessary to proof loaves in the pan.
4. The color of crust of the finished loaf.
5. The symmetry of form of the finished loaf.
6. The evenness of bake of the finished loaf.
7. The character of crust of the finished loaf.
8. The taste of the finished loaf.
9. The flavor of the finished loaf.
10. The keeping quality of the finished loaf.

For medium speed mixing conditions it may be said to increase to some extent the absorption of a flour. Although doughs made with homogenized ingredients were more slack "out of the mixer" they tightened up during fermentation to the same consistency as the control doughs.

It reduces oven losses and increases correspondingly the retention factor and the yield of bread per barrel of flour. This was most noticeable at the normal absorption of the flour.

It gives—

1. A better volume of loaf.
2. A better break and shred.
3. A better color of crumb.
4. A better grain.
5. A better texture.

As a result a better appearing loaf is produced which scores higher than the control loaf made in the usual manner.

In conclusion it may be said that under the condition studied, i. e., medium speed mixing, our particular formula and the use of hydrogenated cotton seed oil shortenings solid at ordinary tempera-

tures, the above experiments tend to establish the fact that homogenization is an improvement over ordinary methods of mixing bread ingredients. The use of various types of shortenings and a comparison of regular procedure vs. homogenization in the case of high speed mixing is a matter which we propose to study at a later date. Further, the obvious advantage which homogenization offers in the direction of economy of time, labor and materials, has not been considered in the above. Interesting data could be gathered upon this phase of the process but this is a matter better studied on a full size commercial installation. This also is deferred for further study. \_\_\_\_\_

### *Chemist and Baker*

There was once a little girl who prayed "O God, make me pure; make me absolutely pure like Royal Baking Powder!" Now it does not do any harm for baking powder to be pure because it gets mixed with so many other things, but if the flour is absolutely pure, and the fat and the salt and the water, well somehow the bread is not so nutritious as it might be.

C. P. Sucrose is a beautiful product, a triumph of technology in which the Division of Sugar Chemistry may well take pride, but it is not so tasty as maple sap or cane juice. It has lost its vitamins. That, I think, is why pure science is so distasteful to the layman. It has lost its vitamins. To put a modern high-grade text book in the hands of an ordinary reader is like feeding decorticated rice to a soldier. It gives him mental beri-beri.

I am not sure that even in a textbook a bit of history or a few personalities would be out of place.

—Edwin E. Slosson, author of "Creative Chemistry," in the Journal of Industrial and Engineering Chemistry.

Doctor Slosson has here outlined one of the great tasks of Baking Technology in its editorial efforts to tell the story of Baking Science so a baker will feel it is written for him instead of in a deliberate effort to go "away over his head." It is a comforting thing to an editor engaged in such a herculean task to find someone within the ranks of Science itself who speaks up against the mere flub-dubbery of a so-called "scientific presentation." Chemistry is not the only Science that can "get into overalls" to the great advantage of all. A certain man who deeply loved music found that orchestras and composers had a way of giving us forty minutes of mere flub-dubbery to prove they were accomplished, to every twenty-minutes of real melody they afforded.

He stripped a symphony orchestra of its high-sounding name, and stripped the music of its foolish exercises. Then he placed the orchestra in the front rows of a moving picture theater and kept a line of standees outside of the theater several blocks long through each performance. This man was Rothapfel, once a music-loving barkeep in a Deadwood, N. D., saloon but now the king of Moving Picture Theater managers with hundreds of theaters built to duplicate his magic method of entrapping an audience. Many copied the beautiful lines of his theater. Many dressed up ushers in "snappy style" like his but only a very, very few knew his real secret—that he had drafted one of the world's great arts, and put it to work in a real spirit of service to his movie audiences.

The world of Bakerydom is surely a splendid audience. And precious indeed are the words of scientists who genuinely wish to serve it. We wish we had more of them for this magazine.



# False Claims as to Badex

*How the Name of the American Institute of Baking Was Wrongfully Used in its Advertising*

THE attention of the American Institute of Baking has been called to an advertising circular which contains descriptive matter, claims and statements relating to the use of Badex in bread and cake making. This circular also contains references to a letter "written by Dr. D. Julian Block to Dr. H. J. Barnard of the American Institute of Baking."

The use of the name of the Director of the American Institute of Baking in the advertising literature of this product appears to imply that the claims for Badex as set forth in this circular had been favorably passed upon by the American Institute of Baking. On November 9, 1922, the following letter was written to the manufacturers of Badex in reference to the unauthorized use of the name of the Director of the American Institute of Baking in this connection.

"November 9, 1922.

The Stein-Hall Co.,  
2841 South Ashland Ave.,  
Chicago, Ill.  
Gentlemen:—

My attention has been called to a circular issued by your firm under the name "Badex" in which you discuss Badex and the qualities which make it of use to the bakery.

On the third and succeeding pages of this circular you quote from a letter purporting to be written by Dr. D. Julian Block to Dr. H. J. Barnard of the American Institute of Baking, thus giving the impression that the material in the bulletin has been considered by the American Institute of Baking.

I should be glad to have you clear up this matter for there is no letter from Dr. D. Julian Block in the files of the American Institute of Baking, nor do I nor any of us at the Institute

recall ever having seen the data which you say has been laid before us.

Awaiting your early reply, I am

Yours very truly,

H. E. Barnard (Signed),  
Director."

This communication was referred to Dr. D. Julian Block of the Stein-Hall Co., who replied as follows:

"November 18, 1922.

Dr. H. E. Barnard,  
Director, American Institute of Baking,  
Chicago, Ill.

My dear Dr. Barnard:—

Acknowledging your courteous favor of November 9th relative to our pamphlet on Badex, please be advised that this pamphlet was prepared by our Advertising Department without the approval of our technical staff, with the result that certain errors, unintentionally, no doubt, crept in. As per your suggestion, this document has been withdrawn and in conformity with our conversation of yesterday, the writer has arranged to have future Badex advertising matter submitted to the laboratory for vise before going to the press. The writer is anxious to assure you that if this plan is followed, no further inaccuracies will appear in print.

Anent the letters quoted in our pamphlet, please be advised that these letters were given to our Mr. Yeager for transmission to you. We feel, through oversight, that the letters were never brought to your attention by Mr. Yeager, and the writer regrets exceedingly that the publication of these letters has caused you embarrassment.

Please accept my thanks for the courtesies extended to me while at the Institute yesterday, and believe me with warm regards,

Yours sincerely,  
(Signed) D. Julian Block."

In acknowledgment of Dr. Block's letter of November 18th, Dr. Barnard wrote as follows:

"November 20, 1922.

Dr. D. Julian Block,  
Stein-Hall Mfg. Co.  
2841 South Ashland Ave.,  
Chicago, Illinois.

My Dear Dr. Block:—

I have your letter of November 18th in which you advise me that the pamphlet on Badex, which was prepared by your Advertising Department without the approval of your technical staff and which contained several mis-statements and scientific inaccuracies, has been withdrawn and that no further copies will be distributed.

I am glad to have your assurance that no further inaccuracies concerning Badex will appear in print. While I appreciate the position you take with respect to the further distribution of the pamphlet, I regret that you suggest no way by which the misinformation which has been spread concerning Badex can be corrected. Before the matter is closed, it must be made very apparent to the baking industry that the American Bakers Association, and that I, as Director of the American Institute of Baking, had no knowledge of the pamphlet or of the material contained in it and that neither the Institute nor I can be held to be negligent in the protection of the baking industry against the distribution of advertising material which is not strictly in accord with scientific facts.

Very truly yours,

(Signed) H. E. Barnard,  
Director."

The pamphlet or circular which was the occasion for the above correspondence consisted of ten pages of printed matter entitled "Badex." The single caption "Badex" appeared at the top of the first page and there were no references in the text to the author of it, or to those responsible for its publication.

The statements relating to Badex were classified by marginal notations on the left of the first and succeeding pages under such phrases as "What is Badex"—"Not a substitute"—"Not a filler"—"Bread improvement"—"Badex retards the aging of bread"—"Changes in bread on aging"—"How bread becomes stale"—"Acidity of Badex"—"Dough losses"—"Increased yields"—"Malt extract and diastase"—

"Keeping quality of bread with Badex"—  
"Loaf texture and size"—"Amount of food necessary for yeast"—"Badex without malt"—"Sugar values"—"Flour"—  
"Flour values and the effect of Badex"—  
"The use of Badex with mineral salt."

This is certainly a most imposing array of subjects for interesting the reader in the virtues of a single product, and comprehensive enough to suggest the impression that the great panacea for bake-shop troubles has at last been discovered in this remarkable material.

On the first page of the circular, we find under the notation "What is Badex" that it is "essentially a blend of dextrines and sugars obtained through the carefully regulated conversion of cereal carbohydrates." Just how these "cereal carbohydrates" suffer "Conversion" is not explained here, but one would venture the opinion that the method is not theological but chemical, and that the effective agent employed is hydrochloric acid.

The "cereal carbohydrates" from which results this remarkable "blend of dextrines and sugars" are none others than those compounds familiar to the baker as the starches. If Badex is examined under the microscope the observer will note changed and unchanged granules of starch in the field, resembling corn starch which has been subjected to the slight effects of acid and heat.

When starch is treated with one-half of one per cent hydrochloric acid and then subjected to a short heating of about one hour and a half at 325° F., hydrolytic products will be obtained, consisting largely of dextrines, soluble and insoluble starch, and a small amount of substances which reduce Fehling's solution. It will contain but a slight amount of protein and ether extract, and will have a titratable acidity largely due to hydrochloric acid.



Badex is a product of this category, which, according to the analysis of the circular, contains 62.10% of dextrines, 12.80% reducing sugars (denominated here maltose and dextrose), and 13.14% starch, with 1.20% protein, and a slight amount of ether extract. The total acidity, expressed as lactic acid, and mainly due to hydrochloric acid, which is not mentioned, is 0.38%.

It is therefore not essentially a "blend of dextrines and sugars" as there is more starch in Badex than sugar, as is indicated by their analysis. The function of Badex is a highly laudable one according to the circular, which is to "produce a loaf having greater nutritive value, better keeping qualities, a whiter and finer textured crumb, a better flavor and a rich golden brown crust." This is what the baking industry wants, and any single compound which can do all these important things is "what we are looking for."

However, we are unable to agree that Badex will give us a "loaf having greater nutritive value," as its composition does not include foodstuffs of importance other than carbohydrate, which bread does not lack, and even this is greatly reduced in amount because of the statement expressed on page two that Badex has "a natural absorption very similar to good flour which gives the baker increased yield." It is therefore plainly evident that if Badex has an absorption equal to the flour, an equivalent amount of water must be added to the dough batch to take care of the added Badex. This would not result in raising the nutritive value of the loaf but it would reduce the total food material according to the amount of water added.

The claim is made on the first page of the circular that "the blend of sugars, dextrose and maltose in Badex results in

the evolution of carbon dioxide at a uniform rate over a long period." No data is presented to demonstrate this property, neither is there any experimental evidence presented to show that after the "production of carbon dioxide from this source," (dextrose) "has reached a maximum, the dissaccharide maltose comes into play and an additional volume of gas is evolved, which continues until after the dough is in the oven."

One would infer from this statement that the enzymes of the yeast exercises an orderly and regular selection of sugars for the production of carbon dioxide. It would be interesting to know what laboratory technique was employed to determine this selective action on the carbohydrates of Badex.

Under the notation "Badex is not a substitute" we find that it contains 12-14% maltose and dextrose (with the important information that dextrose is a directly fermentable sugar) "and many other valuable elements for bread making." What are these valuable elements? The reader is not enlightened further but wonders if this might not refer to merely corn starch and dextrines.

The information that "Badex retards the aging of bread" on page two, with allusion to the work of Katz on this and succeeding pages is a glaring example of how not to interpret scientific research for purposes of advertising propaganda. The theory of Katz on the staling of bread is presented in such a manner that Dr. Katz would never recognize it and then offered as the reason why additions of Badex retard the aging of bread. Since the critical review of bread staleness theories by Wolfgang Oswald in the *Kolloid Zeitschrift* appears to have been overlooked by the author of the Badex circular, it is suggestive to point out here

that there is no unanimity of opinion among physical chemists on what causes bread to stale and how it can be prevented.

If Badex retards the aging of bread it has not been observed in our laboratories. The author of the Badex circular states that it is an ingredient tending to render the "liquefaction of starch more complete" and for this reason "will manifestly serve to retard the aging of bread," and further, that "Badex owes its efficiency exclusively to this property." Experimental evidence that a "blend of dextrines and sugars" will liquefy starch is lacking, and appears particularly inconceivable because Badex itself contains considerable insoluble starch.

Under "Acidity of Badex" we find that "this acidity tends to convert the starches in wheat flour into sugar." This is highly improbable as the amount of acid added by two pounds of Badex to one hundred pounds of flour would have very little specific influence as a hydrolytic agent under the conditions of enzyme action.

The protective action of the dextrose of Badex as stated under "Dough Losses" and "Increased Yields" cannot be substantiated. Fermentation losses in dough fermentation are not prevented by additions of carbohydrate material such as Badex, containing small amounts of fermentable sugar.

The combination of malt extracts of diastatic activity with Badex is lauded as a "genuine improvement in bread production." It would seem that such combinations would further complicate the problem of how to adjust necessary amount of diastatic malt extracts to certain types of flour, and especially in the performance of that "sacred duty to bread quality" which the baker is exhorted to study on page six under the topic "amount of food necessary for yeast." Still Badex "can be used with or without

malt because the 'invertase' action" of yeast "is pressed into service giving excellent results." What exerts the pressure?

Further, we learn that yeast exercises a preferential taste for malt sugar in distinction to cane sugar and again that it selects dextrose immediately after the dough is set, which in some mysterious way insures an even fermentation.

Under "Flour" we find that Badex "assists in equalizing the different grades of flour and maintaining an equal balance between the gluten and starch and the working quality and food value greatly enhanced." This is so silly that it requires no comment.

The circular concludes with a page of speculation on "The use of Badex with Mineral Salts" and ranges from a mention of the composition of yeast ash to a theory on the origin of dental caries, in order to support the contention that calcium salts are unavailable as a source of yeast nutrition in the presence of cane sugar.

This final contention is an absurd misstatement of established scientific fact which can be easily disproved by culturing yeast in various sugar solutions in the presence of calcium salts. The author or authors of this circular should have known that gas production in cane sugar solutions is greatly increased by small amounts of calcium.

The American Institute of Baking is opposed to such advertising literature as this circular exemplifies and cannot countenance any inference which might create the impression that it has passed favorably upon such manifest inaccuracies as these. The correspondence which has been cited in the course of this article should be sufficient to clarify a situation which, in its many aspects, is most regrettable.

C. B. M.



## Books for the Baking Laboratory

**FOOD PRODUCTS, THEIR SOURCE, CHEMISTRY AND USE.** By E. H. S. Bailey. P. Blakeston's Son & Co. Second Edition. 1921. 550 pages.

The second edition of this work has been largely rewritten to bring the text into accord with the many changes of the food supply and beverages which have followed the world war.

Without hunting through the specialized literature of the scientific libraries, the baker can find in these pages a comprehensive idea of the source, composition, characteristics, uses, food value, and probable adulterations of the many ingredients which he is using daily in his plant.

The discussion of foods is not too technical in nature, but sufficient data on physics and chemistry is included to point out the differences in processes and food values.

Covering as it does practically all the common, and many less commonly used foods, the chapters on bread and other cereal products are limited to the more fundamental facts. They are well written.

Bakers will be glad to note the place among foodstuffs accorded to bread in this authoritative review of foods.

"Bread of some kind," says Prof. Bailey, "has so long been THE MOST IMPORTANT FOOD OF THE RACE and improvements in the methods used for preparing bread have kept pace with the advancement of the race toward civilization. Reference to bakers and baking are numerous throughout the earlier literature; not only the writings of the Jews but those of the Egyptians and Romans are full of these references. In 170 B. C. baking became a regular trade in Rome."

Since we now know quite fully that yeast adds a distinct flavor and an appetizing quality to bread, Prof. Bailey's estimate of the value of unleavened as compared to leavened bread is of special interest.

"Not only will unleavened bread keep quite a long time" he says, "but another advantage is that it is so hard and dry it requires thorough mastication, and will when eaten become thoroughly mixed with large quantities of saliva, which aids digestion.

"This variety of bread is NOT HOWEVER USUALLY CONSIDERED TO BE VERY APPETIZING and for general use it has NEVER TAKEN THE PLACE of raised bread.

"In Germany, as well as in America, more than

fifty years ago numerous attempts were made to produce good products without employing fermentation. Liebig calculated that in Germany the daily loss of material by the growth of the yeast plant would be sufficient, if saved, to supply 400,000 persons with bread. Baking powders and other chemicals are some of the results of these experiments.

"Aerated bread was invented in 1856 by Dr. Dauglish, an Englishman. It seemed for a time it would replace other kinds of bread in the United States but for some reason, probably on account of the LACK OF YEAST FLAVOR to which we have become accustomed, or because there is no peptonization of the proteins, this bread is NOT MADE IN THE UNITED STATES IN ANY QUANTITY."

Yeast raised bread is explained, as to its superiority, through the fact that "the gluten is composed of two substances, gliadin and glutenin. Gliadin is the substance which binds the flour particles together to form the dough and gives it tenacity and adhesiveness, while glutenin is the material to which gliadin adheres. These two substances must be present in the flour in right proportion if the flour is to have the highest bread-making properties. The proportion of protein is, however, but little altered by the process of bread-making, although some of the soluble proteins have been used up by the yeast. The slight loss of both nitrogen and carbon compounds that may take place during the process are MORE THAN OFFSET BY THE INCREASED SOLUBILITY AND DIGESTIBILITY OF THE PROTEINS and carbohydrates in the finished product. About 10 per cent of the starch is changed to soluble forms by soluble ferments secreted in the yeast plant. These act upon the starch to form soluble carbohydrates."

An appendix of six sections contains valuable reference tables of chemical composition and food values, and a statement of the Federal Food and Drugs acts as amended to 1913.

Laboratory Experiments on Food Products by E. H. S. Bailey, is a 45 page manual of simple experiments in the identification and testing of foodstuffs. It is written to accompany the text of the above book and serves as a laboratory guide for beginners in food chemistry.

L. A. RUMSEY.

## Abstracts of Technical Articles

### Selected for Baking Technology from *Chemical Abstracts*

**Vitamin Requirements of Certain Yeasts and Bacteria.** Casimir Funk and H. E. Dubin. *J. Biol. Chem.* 48, 437-43 (1921).—Autolyzed yeast, shaken with fuller's earth (50 g. per 1), retains most of the substance responsible for the acceleration of the growth of yeast (vitamin D), though yielding to the fuller's earth all of the material active for rats and pigeons. Vitamin D can be removed from the filtrate by shaking with more fuller's earth or with norit. It can be recovered from the former with  $\text{Ba}(\text{OH})_2$  and from the latter with  $\text{HOAc}$ . It promotes the growth of streptococci, but other factors seem also to be involved. L. Greenwald.

**Vitamins.** VI. U. Sammartino. *Biochem. Z.* 125, 25-41 (1921). Preliminary experiments showed that vitamins (source not indicated) accelerate the cell-free zymase fermentation just as it does yeast fermentation. Since this stimulative effect is not observed on other splitting enzymes, to any marked extent, it appears as if it is specific for zymase. The problem of the particular zymase constituent affected is to be the subject of a later paper. F. S. Hammett.

**The Catalytic Activity of Flours.** O. Fernandez and A. Pizarroso. *Anales soc. espan. fis. quim.* 19, 265-8 (1921).—It is already known that the catalytic activity of a wheat flour, as measured by the decomposition of a  $\text{H}_2\text{O}_2$  solution, is directly proportional to the total amount of mineral salts it contains. The authors have compared the catalytic activity of a number of samples with the total  $\text{P}_2\text{O}_5$ ,  $\text{P}_2\text{O}_5$  soluble in 0.04%  $\text{AcOH}$ , and phytin  $\text{P}_2\text{O}_5$  contents and found no evidence of any relationship. L. E. GILSON.

**Determination of the Sugar and Fat Addition in Yeast Baked Goods.** K. Baumann and J. Kuhlmann. *Z. Nähr-Genussm.* 42, 225, 32 (1921). The amount of sugar and fat that may be added to zwieback intended for the sick is controlled by food regulations. The following method was designed as a control method for such products. Sugar, fat,  $\text{H}_2\text{O}$ , and ash were determined upon products baked experimentally from flours used for such goods without the addition of sugar or fat. The dry matter free from the above

four substances was designated as protein plus starch (P plus S). The ratio between the naturally occurring sugar and the P plus S figure was found to be 0.0646 and between fat and P plus S, 0.01636. In the determination of unknown baked goods the P plus S figure is obtained and by the above ratios the per cent of natural sugar and fat calculated, and these values are subtracted from the total sugar and fat found, giving the added sugar and fat. L. D. ELLIOTT.

### Patents Granted

**Condenser Adapted for Recovering Alcohol in Bread Baking.** J. Y. Pisceck. U. S. 1,394,502, Oct. 18.

**Leaven.** R. Nachimento. U. S. 1,380,828, June 7. A leaven adapted for use in making bread is formed by boiling about 2 lbs. of potato peelings in sea water for about 25 minutes, separately boiling about 4 ounces of hops, mashing the skins and thoroughly mixing with them about 3 pounds of sugar and 3 cupfuls of wheat flour, adding the hops and hot  $\text{H}_2\text{O}$ , mixing cream of tartar and  $\text{Na}_2\text{CO}_3$  with the mass, adding more sea water and setting the material to rise.

**Bread.** R. Graham. U. S. 1,387,387, Aug. 9. In preparing edible tubers for use with flour in bread-making, the tubers are subjected to a gelatinizing and converting action by the addition of barley malt or other malted cereal or malt extract or similar enzymic material. Rice, peas, beans or lentils also may be similarly treated for use with flour in bread-making. Bread of good texture and keeping qualities is obtained from mixed starchy materials treated in this manner, with or without addition of bran or middlings.

**Bread.** C. J. Patterson. U. S. 1,385,842, July 26. In making bread, about 0.0033% of  $\text{H}_2\text{O}_2$  is added to the dough ingredients to increase their moisture-absorbing capacity without breaking down the gluten. Somewhat larger amounts of  $\text{CaO}_2$ ,  $\text{MgO}_2$ ,  $\text{Na}_2\text{O}_2$  or  $\text{K}_2\text{O}_2$  may also be used.

**Conditioning Flour With Chlorine and Peroxides.** E. C. Sutherland. U. S. 1,381,079, June 7. Meal or flour is treated with sufficient  $\text{Cl}^+$  to react upon the enzymes present and render them inactive and is then treated with  $\text{H}_2\text{O}_2$  and exposed to ultra-violet light to produce nascent O which acts as a bleaching and improving agent.



# How a Baker Lowered Costs

*He Had Coke for His Coke-Fired Oven Analyzed and Found He Could Save \$3 per Ton Without Loss in Fuel Value*

IF THE ovens in your bakery were coke burners and two different coke concerns offered you fuel with a spread of \$3 per ton in the price, what would you do about it?

Many a baker has merely guessed, and bought inferior coke that in the end was more expensive than the better grade at a higher price. One baker who was perplexed by just such a problem sent samples of both offerings to the American Institute of Baking's service laboratory. He was puzzled when he sent the samples in. Now he is happy and has saved, with the assurance that he knows he was right, several hundred dollars on his winter's coke supply.

He found that the \$3 could be saved per ton without the slightest loss in quality or quantity of heat units per ton. So careful was the Institute's analysis made, that had the baker been operating some other kind of a plant than a bakery, he would have been advised to buy the more expensive coke. The difference discovered on analysis was found to be important for other types of coke usage, but not for heating a baker's oven.

The baker who sent in his coke samples happened to have a boy in our School of Baking. This youngster was allowed to stand by while A. W. Landstrum, chemist of the Institute's service department, made the chemical demonstration of the fact that the cheapest coke was the most suitable for bakery usage. The student thus gained an insight into the merits of laboratory control for bakeries which will remain with him through the rest of his life. It will come in handy later to save him a vast amount of

useless expenditures, since "rule of thumb methods" and "buying by brand" have cost the baking industry a pretty fortune in the past.

This same student brought a sample of his home town water supply to be analysed. It was found on analysis that the water was practically the same in composition as Chicago tap water, with which he had become familiar, having mixed doughs with it for two months in the bake shop of the School of Baking. All of his carefully prepared notes and observations as to fermentation conditions can now be used directly when he reaches home; he need have no fear of troubles due to water supply. Guesswork has been eliminated: HE KNOWS!

It is just this sort of helpful, practical, work-a-day information that your Service Department gives you; to this end has it been organized. Use it. In a short while a booklet will reach each member of the Association describing the correct methods of sampling all materials. For a limited time no charge will be made for work done for members. In the meantime don't overlook the opportunity of knowing what you are about to buy. Demand a sample and get your Service Department's opinion on it before purchasing.

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Your Baking Technology is certainly the best trade paper I have ever read. It is practical, readable and sufficiently technical to appeal to the student who is doing research work and understandable enough for the practical baker who wants to advance. I am mighty glad to have it and read every page of it.

A. W. BRUNER,  
Chief Food and Sanitary Inspector, Indiana State  
Food Department.



















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